THE GAS JOURNAL

NOVEMBER 30, 1932

Vol. 200 84th Year No. 3628

A Glance at the Contents—

Assistant Manager and Chemist Required.

As will be seen from our advertisement columns, applications are invited for the appointment of Assistant Manager and Chemist for a gas company in the Eastern Counties. [p. 635.]

Oriental Gas Company.

A decrease in gas sales of only 1·2%, in spite of disturbed conditions in India at the present time, was reported by the Chairman at the Annual Meeting of the Oriental Gas Company on Nov. 24 last. [p. 630.]

Hastings and St. Leonards Gas Order.

An inquiry into the provisions of the Special Order promoted by the Hastings and St. Leonards Gas Company (under the Gas Undertakings Acts) was held by Mr. J. F. Ronca (Director of Gas Administration) at the Board of Trade Offices, Westminster, on Nov. 21. [p. 621.]

Croydon Company's New Sports Pavilion.

As the culmination of a scheme, which extends back over a considerable period, to provide adequate sports facilities for their employees, Mr. William Cash, Chairman of Directors of the Croydon Gas Company, declared open a very fine new pavilion on the Company's sports ground at Plough Lane, Wallington, on Saturday, Nov. 26. [p. 618.]

A New Parkinson Cooker.

The Parkinson Stove Company, Ltd., have introduced a new type of gas cooker, named the "Birma." [p. 612.]

Gas Companies' Protection Association.

The Thirty-Fifth Annual General Meeting of this Association was held at the Caxton Hall, Westminster, on Wednesday, Nov. 23, when Mr. R. W. Edwards, the Chairman, gave a comprehensive survey of present-day matters concerning the Industry. [p. 615.]

Deputy Accountant Required.

A Gas Company invites applications for the post of Deputy Accountant, the vacancy arising owing to the present holder of the post having been appointed Secretary and Accountant to the Jersey Gas Light Company, Ltd., recently advertised in the "JOURNAL." [p. 635.]

Mechanized Accountancy at Ramsgate.

In a paper before the Southern Association of Gas Engineers and Managers at their General Meeting in London on Nov. 16, Mr. F. G. Sale, Secretary to the Ramsgate Corporation Gas and Water Department, explained his Department's rental office system by means of accounting machinery, as an example of the extent to which smaller undertakings can go in this direction. [p. 623.]

Forthcoming Engagements

Dec. 3.—NORTH OF ENGLAND AUXILIARY.—Meeting at Newcastle-upon-Tyne. Paper by Mr. B. Richardson.

Dec. 3.—SCOTTISH JUNIOR ASSOCIATION (EASTERN DISTRICT).—Paperette Day at Perth.

Dec. 3.—SCOTTISH JUNIOR ASSOCIATION (WESTERN DISTRICT).—Meeting in Royal Technical College, Glasgow. Papers by Mr. A. R. Anderson (Alexandria) and Mr. W. Campbell (Helensburgh).

Dec. 8.—MIDLAND JUNIOR ASSOCIATION.—Paper by Mr. W. Hind, of Coventry.

Dec. 9.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Meeting at Westminster Technical Institute. Paper by Mr. R. N. LeFevre.

Dec. 10.—YORKSHIRE JUNIOR GAS ASSOCIATION.—Meeting at Leeds University. Presidential Address of Mr. J. W. Wood.

Dec. 12.—INSTITUTION OF GAS ENGINEERS.—Meetings of Joint Research Committee, 10 a.m.; Liquor Effluents and Ammonia Sub-Committee, 12 noon; Finance Sub-Committee, 2 p.m.; Finance Committee, 2.30 p.m.; Executive Committee of the Council, 3 p.m.; Purifiers Sub-Committee, 5 p.m., 28, Grosvenor Gardens, S.W. 1.

Dec. 13.—INSTITUTION OF GAS ENGINEERS.—Meetings of Council, 10 a.m.; Education Executive Committee, 4 p.m., 28, Grosvenor Gardens, S.W. 1.

Dec. 13.—WESTERN JUNIOR ASSOCIATION.—Inspection of Gas Installation of Imperial Tobacco Company, Ltd., Bristol. Paper by Mr. E. S. Davies.

Dec. 13.—NATIONAL GAS COUNCIL.—Meeting of Central Executive Board, 28, Grosvenor Gardens, S.W. 1.

Dec. 13.—FEDERATION OF GAS EMPLOYERS.—Meeting of Central Committee, 28, Grosvenor Gardens, S.W. 1.

Dec. 14.—SCOTTISH JUNIOR ASSOCIATION (WESTERN DISTRICT).—Visit to "Glasgow Herald" Offices.

Dec. 15.—S.B.G.I.—Council Meeting, 2.30 p.m.

Dec. 17.—SCOTTISH JUNIOR ASSOCIATION (WESTERN DISTRICT).—Annual Social, Ca'doro Restaurant, Glasgow.

Dec. 21.—B.C.G.A.—Meeting of the Executive Committee, 12 noon, 28, Grosvenor Gardens, S.W. 1.

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Page 36. JERSEY. Mr. R. A. Fuller appointed Secretary and Accountant.

EDITORIAL NOTES

A Wrong Angle

A FEW weeks ago, Sir David Milne-Watson took the opportunity afforded by a visit of the members of the Coke Oven Managers' Association to the Koppers coke oven plant and the benzole extraction plant at the Beckton Gas-Works to make some weighty remarks on the coal situation. Just prior to that, an analysis of the prevailing conditions in the coal industry had been given by Sir Hugo Hirst, in his Presidential Address to the Institute of Fuel. It was shown in that address that in fifty of the most important coal mining undertakings the earnings on ordinary capital for 1931 amounted to only 1%, and that since the war the output of coal in this country has fallen by about 60 million tons per annum. The seriousness of the position being realized, we were faced with a "Back-to-Coal" movement, and the formation of a Coal Utilization Council (representative of the Mining Association, the coal merchants, and the traders), seemingly having for its object to sell more coal to industry and to the householder—*i.e.*, to endeavour to induce the public to burn more coal in its raw state. What Sir David Milne-Watson did in his remarks was to draw attention to the need for coal to be utilized, not in its raw state, but in the form of gas or electricity. This, he said, was the way for the coal industry to fight oil, which one could hardly imagine being ousted in places like London by raw coal, though, with favourable prices, its effacement might well be accomplished by gas or electricity. This being so, it was a mistake for the coal industry to regard gas and electricity as rivals. We repeat Sir David's points now, for repetition is clearly necessary, in spite of all that has been said and written on the subject.

For proof of this necessity, one has only to turn to the pages of "The Times," where widely diverse views have been expressed in a lengthy correspondence on "Coal Quotas." Among the contributors to this correspondence has been Mr. A. W. Archer, Vice-Chairman of the West Yorkshire Coal Owners' Association, Chairman of the Export Committee of the Midland (Amalgamated) District (Coal Mines) Scheme, and Managing Director of Colliery Companies, who undertook to reply to various assertions made by Mr. Lishman. One of the statements which had been put forward by Mr. Lishman was to the effect that: "Gas and electricity undertakings and householders are all paying more for coal than they would but for Part I. of the Act, yet the miner is getting no more wages and much less employment. The first part of Mr. Archer's answer to this is as follows: "Gas and electricity works depend largely upon coal; the cheaper they purchase (and they often purchase at less than cost), the more profit they make, and the *more seriously they compete against coal itself.*" The words which we have italicized here are our justification for stressing the necessity of repetition of Sir David Milne-Watson's claim that it is a mistake for the coal industry to regard gas and electricity as rivals. Are all the efforts that have been, and are being, made to purify the atmosphere of our towns by the use of gaseous or solid smokeless fuel to be looked at from the wrong angle of competition with the coal industry, upon which they "depend largely?"

Strangely enough, at the moment of writing this there comes to notice a most appropriate paragraph in the eighth annual Norman Lockyer Lecture delivered on Tuesday of last week by Sir Frank E. Smith, K.C.B., C.B.E., LL.D., D.Sc., Sec.R.S., who took for his subject "Industrial Research and the Nation's Balance Sheet." This paragraph is as follows: "As a nation, nature has well provided us with potential energy. We have an abundance of coal, certainly not less than 100,000 million tons of it. Last year we mined about 220 million tons. Of this about 43 million tons were sold abroad, and the remainder was used to provide power for our industries and heat and light for our homes and workshops. Notwithstanding this abundance of power, we imported power from abroad. Motor spirit valued at £18,690,000 was bought last year; next year the same quantity may cost us £26,000,000. The scientist wishes to use all materials to the best advantage, and the place of petrol and oil fuel in the life of a nation is obvious; but waste is hateful, and our coal is being wrongly used because much of the knowledge we have is not being applied and other knowledge which would enable the power in our coal to be used for all purposes where heat, light, and power are required is not yet available. In general we are using coal as our grandfathers did. Then the consumption was small, but at the present time an annual consumption of over 150 million tons of coal produces a pall of smoke over our industrial towns, and damage is done both to the health of the people and to our buildings. The problem for science is to convert coal into forms more suitable for our everyday needs. Then our imports of power will be reduced."

The Gas Companies' Protection Association

A BALANCED review of the present position of affairs as affecting the Gas Industry was given last week by Mr. R. W. Edwards, of Aldershot, in his address as Chairman at the annual meeting of the Gas Companies' Protection Association, but it will be no reflection upon the weight and value of his remarks to say that the proceedings were overshadowed by the loss through death of Mr. F. E. Cooper, who had acted as Secretary to the Association since its formation more than thirty years ago, and who was also well known as head of the firm of Messrs. R. W. Cooper & Sons, Solicitors and Parliamentary Agents. Sound in his knowledge of General Law and Parliamentary Practice, Mr. Cooper was beyond this a veritable mine of information on matters pertaining to the Gas Industry in particular. This information he had accumulated through years of diligent study and investigation of problems, figuratively speaking, as wide asunder as the poles. Oftentimes have members of the Gas Companies' Protection Association, at their annual gatherings, listened with wonder at his enumeration of the main subjects with which, on behalf of subscribers, he had dealt in the preceding twelve months. These enumerations pointed at one and the same time to the worth both of the Secretary and of the Association.

Turning to last week's meeting, one is not surprised at the fact that Mr. Edwards felt impelled to draw attention to the tendency on the part of mineowners to regard the Gas Industry as one of their keenest competitors. This is a tendency that must in some way or another be removed, and the only method that suggests itself is frequent repetition of both the spoken and the written word. Mr. Edwards says, and we repeat here: "The days of raw coal consumption for domestic and many other purposes are numbered. It is only in the forms to which it is converted by gas and electricity undertakings that British coal can hope to compete successfully against oil lighting and heating, oil cooking, and oil and petrol engines. Gas is still opening up new means of maintaining the demand for coal." This is the lesson that so badly needs learning in some quarters.

There are a good many encouraging points in the address, and Mr. Reginald G. Clarry, M.P., was able to add another, by reminding the members that, in the direction of legislation, the past year has been a particularly good one for the Gas Industry.

Bottled Gas in the Eighteen-Twenties

We are indebted to a correspondent for sending us a copy of a letter from one W. A. Neill published in the "Evening Standard" on Feb. 2, 1869. The title of this communication is "Gas Afloat," and it has singular interest at the present time, when "bottled gas" is a topic of the day. The letter in question was "one better" than another published on Jan. 28 of the same year, in which it was stated the "Wellesley" was the first ship illuminated with gas, and, therefore, that novelty did not attach to the gas lighting on board H.M.S. "Monarch" in 1869.

"Allow me to say," writes Mr. Neill, "that more than forty years ago there was at all events one ship lighted with gas. The vessel in question was the steamer 'Duke of York,' belonging to the General Steam Navigation Company, but at the time to which I allude was chartered by Government, and employed in carrying mails and passengers between London and Portugal, Spain, and the Mediterranean. Of this steamer my late father was for some time surgeon, and I have frequently heard him describe the way in which the gas was carried and applied. It was not made on board, as in the case of the 'Monarch,' but kept in iron bottles, one of which was screwed on to the 'main,' and when the gas contained in it was consumed, a fresh bottle was substituted."

Though we cannot visualize much demand for bottled gas by H.M. Navy in 1932, the whole technique of the subject has been so transformed by developments in manufacture of high-tensile alloy steels and in compressing plant that its use on private yachts offers a promising—though not a novel—field. Many of our readers may recollect a description of a gas installation on a yacht barge which was published in the "Journal" for Feb. 10 of this year. The owner is a keen enthusiast of gas, and when his craft is berthed, a flexible pipe connection enables the amenities of gas to be enjoyed on board. To quote from the description, which was contained in a letter from Mr. E. W. Bonsey, of the Southtown Gas-Works, Great Yarmouth, the owner's "one regret is that when cruising gas is not available." Work at Birmingham and elsewhere on the safe storage of gas at high pressures affords a likely solution to the problem; and a satisfied "Thank Goodness for Gas" may well be heard once again out at sea.

Mechanized Offices

Only a few months ago we published a most useful account of the installation of machinery in the offices of the Swansea Gas Light Company, this account forming the substance of the Presidential Address of Mr. Ernest Ablett to the Wales and Monmouthshire Association. In that Address the author proved his contention that the economical use of office machinery is not confined to the large undertaking. Additional evidence of this fact is at hand in the "Journal" to-day, in which Mr. F. G. Sale, Secretary to the Ramsgate Gas and Water Department, decribes the mechanized rental office system put into successful operation by his undertaking, which has an annual output of 300 million c.ft. of gas. We welcome the description, which formed the subject of a paper at the recent meeting of the Southern Association, not only because of its worth to those who may be contemplating a change in their office organization, but also because it indicates a change in the attitude of the District Associations, who are encouraging the discussion of general problems confronting the gas manager as well as of technical problems confronting the gas engineer.

We think that a good deal of the time at present wasted could be saved by a more general adoption of office machinery. Nor is this the only point. Machines, besides raising the efficiency of the routine work, are adaptable to many purposes other than the billing of accounts; and, once installed, they render changes of policy easier of accomplishment and result in a general tightening-up of the work of the undertaking concerned. Certainly Mr. Sale puts forward a good case for the adoption of machinery. Under the new system all the accounts are in consumers' hands within a fortnight of the new quarter; cash commences to flow in on the fourth day of the quarter; and 80% of the amount due for gas is paid by the end of the second week of the second month, as compared with a much slower rate of payment under the old system. There are other advantages, among which Mr. Sale mentions the fact that all payments in respect of amounts outstanding are credited on the accounts right up to the moment of despatch, thus removing a frequent cause of friction with consumers—that the account is sent out containing an item for which payment has been made. Again, the accuracy of accounts as regards subtraction of last index from the present index, the amount of charge for gas, the hires and hire-purchase items, and the addition, is proved automatically by machinery. The accuracy of the accounts is thus assured and disputed accounts from this cause are unknown.

The new system of mechanization, besides providing many safeguards, improves the relationship between the undertaking and its consumers—it enhances goodwill. Also, the work of the office is kept up to date, allowing any statistical or other information to be supplied immediately; and the spirit of keenness engendered among the staff is "a most valuable asset." The paper will prove most useful, though we suggest that the author's observations on the merits or demerits of continuous billing (not necessarily monthly billing) would add still further to this utility.

Normal Expansion of Municipal Enterprise

In view of the articles which have appeared in recent issues of the "Journal" on the subject of remunerative expenditure and the lead given by Mr. Neville Chamberlain to the Gas Industry to pursue its policy of modernization of plant and improvement of process efficiency, we were particularly interested in a statement made by Mr. Ramsay MacDonald during the debate on the Address in reply to the King's Speech.

There were passages in the King's Speech dealing emphatically with the problem of unemployment, and it was in connection with this urgent matter that the Prime Minister said: "His Majesty's Government have studied the experience of the past, and they have come to certain conclusions about it. They will encourage every normal expansion of municipal enterprise. Everything that is capable of being turned to good use will be done. But we warn the municipalities and this House that rates and taxes cannot be drawn upon extravagantly."

Such expenditure as we have had in mind may be termed "normal expansion of municipal enterprise," and has nothing to do with drawing upon rates and taxes.

In all Seriousness!

We learn of a new use for cotton-wool, which, it is to be hoped, will appeal to the common-sense of nobody. In "The People" for Sunday, Oct. 23, is the following household hint: "Gas—To save gas, unscrew the connection from the gas bracket and put a little cotton-wool into the pipe; then re-connect. The light will be clearer and less gas used." Had this purported to be a joke, any humour it might have contained "escapes" us; but it is a serious suggestion as an aid to the satisfactory running of a home, and if it were carried out the consequences would be the reverse of pleasant. Our Industry has difficulties enough—the filling of service pipes with concrete is an example—but we little thought that "service to the consumer" would be menaced by cotton-wool.

PERSONAL

MR. THOMAS HAWKES HACK.

Tributes were paid on his retirement to the work of Mr. Thomas Hawkes Hack, Engineer at the Saltley Gas-Works since 1919, by the members of the Birmingham Gas Committee at a meeting on Monday; and Alderman J. H. Lloyd, the Chairman, presented to him an illuminated address, expressing the warm appreciation of the Corporation.

Mr. Hack entered the service of the Birmingham Gas Department in 1885, when he was articled to the late Mr. Henry Hack (his uncle), who was then Engineer of Saltley and Swan Village Works. He passed through various stages on the Works, Drawing Office, and Chemical Laboratory, until, in 1888, he was appointed Analyst at the Saltley Works. Mr. Hack left Birmingham in 1892 on obtaining the post of Resident Engineer of the Effingham Street Works of the Sheffield United Gas Light Company, where he remained until 1898, when he was transferred to that Company's new works under construction at Grimesthorpe, personally superintending the erection of much of the plant.

Two years later Mr. Hack was appointed Assistant Engineer to the City of Cork Gas Consumers' Company, and, in 1902, returned to the Birmingham Gas Department as Superintendent at Swan Village. In 1904 he was made Works Engineer, and, four years later, upon the retirement of Mr. Henry Hack, he became Engineer of Swan Village, where he remained until 1919, when, in the staff changes brought about by the appointment of the late Mr. John Foster as Engineer-in-Chief, he was promoted to the post of Engineer at the Saltley Works, which he held until his retirement.

Mr. Hack is succeeded by Mr. W. C. Pinkney, formerly Engineer at the Swan Village Gas-Works.

* * *

Mr. R. A. FULLER, who has been in the service of the Lowestoft Water and Gas Company for nearly twenty years and who now holds the post of Deputy Accountant, has been appointed Secretary and Accountant to the Jersey Gas Light Company, Ltd.

* * *

Mr. H. SPENCER, the new Gas Engineer to the Barnoldswick Urban District Council—and for the past five years assistant to Mr. J. P. Thompson, who has been appointed Engineer at Newbury—was last week appointed the Council's Waterworks Engineer also. Mr. Spencer's experience during his term as assistant to Mr. Thompson has included the Water Undertaking; there was some thought of separating the two posts on the change of personnel, but the Council decided to retain them in Mr. Spencer's hands.

OBITUARY

We have to announce the sudden death of Mr. T. W. WILKINS, who died peacefully on Tuesday, Nov. 29, aged 62 years. Mr. Wilkins will be remembered by a large number of friends in the Gas Industry, having succeeded his father in July, 1897, in the representation of the Gas Meter Company, Ltd.

CORRESPONDENCE

The Applicant's Viewpoint

SIR,—I have read with interest the article with the above title in the Nov. 23 issue of the "JOURNAL," and also "Corregenda's" letter in the issue of Nov. 16.

Apparently those works desiring a new member of their staff, who do not say what salary they offer, hope to get a really qualified man at a cheap rate—a lot below his real value—owing to there being a surplus of candidates.

This, in my opinion, is grossly unfair and bordering on sharp practice. One could not get a labourer or mechanic below his trade union rate. Is it not time the Gas Industry woke up to this fact?

Attention is usually drawn in the Editorial Notes or elsewhere in the Technical Press to the fact that such and such a vacancy is advertised. Could they not add their valuation of the position, or, better still, allow the Institution of Gas Engineers to advise their members (through the Technical Press) of the value of the position? I think most Chartered Institutions look after their members in this or a similar manner. Why cannot the advertisers themselves be honest, and state the *limits* they are prepared to pay?

I have just gone through a bunch of applications for the position of Manager and Secretary of a medium-sized works; they range from £200 to £550 per annum. The £200 applicant seemed well qualified—if anything better than the £550 one—but the former was out of a billet, and the latter in one. Incidentally the advertisers were prepared to pay between £300 and £350. Why did they not say so in the first place?

Yours, &c.,
"RI VERA."

Nov. 26, 1932.

What is Carbon-Monoxide Poisoning?

SIR,—The above question is prompted by a perusal of your report (p. 554, Nov. 23 issue) of a successful claim for compensation against a Gas Company.

The circumstances were remarkable in that

(*a*) The presence of carbon monoxide in sufficient quantity to cause poisoning of even a slight degree—let alone a fatal dose—was most unlikely, and

(*b*) Not one of the usually recognized symptoms of such poisoning was existent.

Dealing with these points in turn,

(*a*) The deceased was assisting in filling a vertical retort with coke at the conclusion of a scurfing operation, and it was successfully contended that carbon monoxide poisoning occurred in the course of this procedure.

The filling of a vertical retort with coke is not a lengthy process, and in all ordinary circumstances the coke would be at atmospheric temperature.

It would take some time for the coke thus placed in the retort to be heated sufficiently to produce combustion of any kind—whether to carbon dioxide or to carbon monoxide, as the case may be—and one would have thought that the retort would be completely filled long before ignition temperature had been reached.

Ignition would be accelerated, of course, were the bottom vent left open, as is the case when scurfing, but this would presumably have been closed prior to filling the retort with coke, for it is not comfortable to work over a ventilated hot retort. Further, the evidence, as reported, gives no indication that a vent was in existence.

It is pertinent to ask, therefore, in what manner the carbon monoxide was formed.

When filling the retort with coke, air would be displaced. The coke, being cold and below ignition temperature, could not have been the source of the noxious gaseous carbon.

It could hardly be suggested that the retort's atmosphere was carbon monoxide for, were it thoroughly scurfed, the necessary carbon would not have been present on its walls.

Even were it not thoroughly scurfed, it is difficult to conceive such a condition as a source of carbon monoxide in sufficient quantity—if at all—to cause fatality.

(*b*) Quite apart from technicalities concerning carbon monoxide production, the evidence was completely lacking in facts supporting the theory of carbon monoxide poisoning.

Our red blood-corpuscles, whose normal function is to carry oxygen from the lungs via the arteries, and carbon dioxide to the lungs via the veins, have a greater affinity for carbon monoxide than for oxygen. In the presence of carbon monoxide, therefore, the body is deprived of its oxygen supply and a state of coma quickly follows.

Nausea is not usually an accompanying symptom *if the victim is merely breathing the noxious atmosphere.*

It often happens, however, that "swallowing" occurs, and in all such cases nausea results.

A state of coma may lead to a fatality, but the symptoms of having swallowed a dose have never, within my experience, represented anything so serious. In such cases a glass of soda and milk (or milk alone) is an excellent antidote.

In the case reported the deceased—after being poisoned—walked down the stairs of a vertical plant and back again. At the conclusion of his job he walked down again, out of the works, and a further distance of 300 yards to his home.

In such circumstances could the deceased have possibly received a fatal dose of carbon monoxide?

Within my own experiences such a feat would have been

impossible had carbon monoxide poisoning actually occurred in even moderate degree.

Although the deceased was represented as working in a vitiated atmosphere, three mates of his who were working with him were entirely unaffected, if the absence of any reference thereto can be accepted as confirming the statement. Further, deceased left his job temporarily, and was not in the offending atmosphere as long as were the unaffected men.

In your report Sir Bernard Spilsbury is stated to have said he had never known a case of death from carbon monoxide where the patient was able, *without losing consciousness*, to remove himself from the vitiating atmosphere. (The italics are mine.)

Presumably Sir Bernard Spilsbury intended to convey that in cases where a man retains consciousness when thus poisoned, he is not able to remove himself from the vitiating atmosphere. Further, that in all fatal cases which have come to his notice, a state of unconsciousness preceded death.

In the case in question there was no evidence of unconsciousness at any stage until the deceased had reached home. This necessitated a walk into the fresh air, and the subsequent state of coma could hardly be said to be due to carbon monoxide.

In the interests of all concerned with the possibility of carbon monoxide poisoning, it would seem advisable that some clearly defined and authoritative information upon all the phases of such poisoning cases be available.

Yours, &c.,
CLAUDE C. CARPENTER.

32, East Mount Road,
York,
Nov. 25, 1932.

Wind Pressure on Spiral Gasholders

SIR,—The article by Mr. S. M. Milbourne, entitled "Wind Pressure on Spiral Gasholders," published in the Oct. 12 and Oct. 19 issues of the "JOURNAL," is a noteworthy addition to his previous article "Spiral Gasholders." Mr. Milbourne stated in the Oct. 12 issue that his article was prompted by my letter. May I take this opportunity to commend him, and express my appreciation for the work he has done? This paper will be of value to all engineers interested in gasholder design; and I hope that it may act as a stimulus to encourage more experimental work along these lines.

The subject of wind pressure demands the most careful study by engineers to-day, for reasons of safety and economy. Structures in general have rapidly increased in size and height in the past few years, and the gasholder in particular has reached such proportions that a most careful analysis of stresses is a necessity. It is only necessary to state that the shell plating of the largest gasholder in the world is only $\frac{3}{8}$ in. in thickness, to impress on the mind of the average engineer the importance of wind pressure study.

The effect of wind pressure on high buildings is being given considerable study at the present time by organized engineering groups, and much literature is available for reference. However, as Mr. Milbourne has stated, very little information is available as regards wind pressure on gasholders, and the structural engineer, by necessity, has invaded the aerodynamic field in search of literature on the subject. While the results of aerodynamic research on wind resistance of models of various cross-sections has been used with remarkable success in the aerodynamic field, these results are not directly applicable at the present time to structures of the size of gasholders, due to a lack of experimental data at large Reynolds numbers. The hangar for the giant U.S. dirigible at Akron, Ohio, is the only structure having proportions of the same magnitude as a gasholder, as far as I know, for which the results of the model tests are being checked for validity by full-size tests on the completed structure (see "Eng. News-Record," July 24, 1930). I have been informed by Dr. Karl Arnstein, under whose direction the tests are being made, that at the present time conclusive data are not available; however, as soon as the results are known we may have some indication as to what may be expected at high Reynolds numbers.

I heartily agree with Mr. Milbourne that conservative values for the normal wind pressure and drag coefficient should be used until sufficient experiments justify the use of lower values.

The "GAS JOURNAL" has performed a service to the profession by publishing these articles on gasholder design; and it is hoped that more may follow.

Yours, &c.,
J. RICHARD DORSEY,
Assoc.M.Am.Soc.C.E.

3012, Beverly Road,
Baltimore, Maryland,
Nov. 17, 1932.

If "Induna" will be good enough to forward his name and address, his letter shall be published in a later issue of the "JOURNAL." This information is not required for publication, but to meet an inflexible rule that the identity of correspondents must be known to the Editor.—ED. "G.J."

THE NEWS OF THE WEEK

A Reduction in the Price of Gas to large consumers is to be made forthwith by the Rhyl Urban District Council—namely, 3d. per 1000 c.ft. on supplies of over 25,000 c.ft. in a quarter, and 6d. per 1000 c.ft. on supplies of over 50,000 c.ft. per quarter.

Moore Carbonizing Company, Ltd., have been registered as a Private Company, to acquire and work patents relating to the distillation or extraction of vaporizable matter from coal, &c., particularly to acquire all or any of the rights, assets, and liabilities of the Low-Temperature Carbonization Syndicate. Nominal capital, £25,000. S. Moore, 37, Cable Road, Hoylake (Managing Director).

The Birmingham Gas Department's Showrooms in Edmund Street have on sale gas fires in seven different colours, ranging from pink to old gold and silver. The Department not only have a fine selection of fires for sale, but offer to remove old gas fires from houses, paint them by a special process, and return them, overhauled, for an inclusive charge of £1. It is estimated that there are no fewer than 100,000 gas fires at present in use in Birmingham homes and offices. Gas cookers reach the extraordinary total of 250,000—which is within 5% of saturation point.

The 9th Annual Dinner of the Tottenham District Gas Company's volunteer Fire Brigade was held on Nov. 23 at the Willoughby Lane sports pavilion. There were about 50 present. After the very excellent dinner, and "The King" had been honoured, Supt. H. P. Morley proposed the toast of "The Directors and Chief Engineer." He paid a high tribute to the former; they were ever ready to consider the needs of those working under them. Mr. H. C. Smith, Chief Engineer, replied and proposed the toast of "The Brigade."

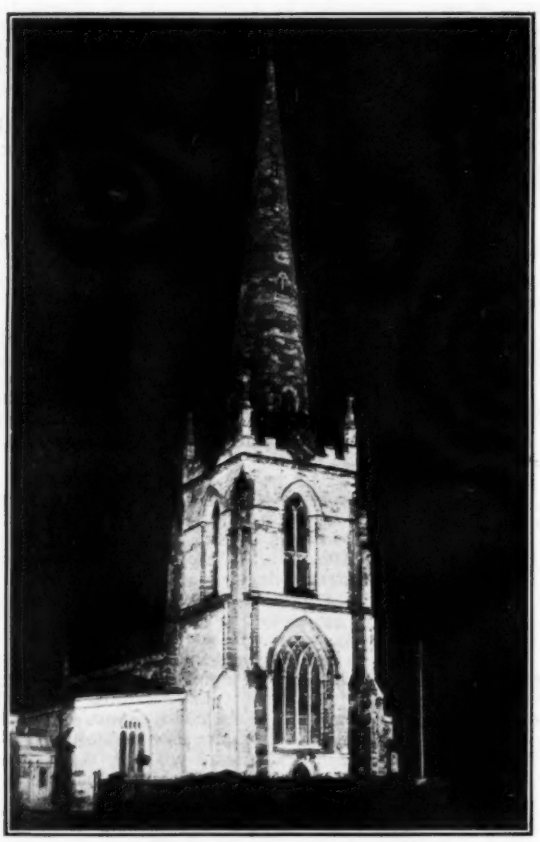
A Little-Known Service rendered to commerce by the Birmingham Corporation Gas Department is the ripening of bananas by artificial heat. Between 12,000 and 14,000 bunches of bananas reach the city in an olive-green condition every week, and are conveyed to local store rooms, each room holding approximately 250 bunches. The rooms are heated by gas burners which are controlled by a very sensitive thermostat. A temperature of between 60° and 65° F. is maintained, gas being used both on account of its cheapness and because it is easily controlled. In the course of about a week the bananas acquire the yellow tint of ripeness, and are then divided into the "hands" or smaller bunches sold by fruiterers.

THE NEWS—continued.

A Brilliant Function took place in the ballroom of Claridge's Hotel last Thursday evening, the occasion being the annual reception of the Institution of Chemical Engineers. The guests were received by the President, Viscount Leverhulme, and Viscountess Leverhulme, and everything contributed to a completely successful evening.

The Demonstrations in the most economical methods of using gas cookers which have been given at the Leamington Priors Gas Company's Showrooms in Regent Street are being followed up for one week—that is, to Saturday, Dec. 3—by the Demonstrator, Mrs. Olive Roberts, C.D.S., calling on housewives who ask at the showrooms for her to do so to advise them on any point in connection with their gas cooking operations, about which they may be in doubt.

170 Roadside Trees, planted in various roads in St. Helens, have been reported by the Surveyor and Engineer of the St. Helens Corporation to the Highways Committee to have died or been destroyed during the year. Several of them were stated to have been killed by gas escaping round them, and he had claimed from the Gas Department for thirty-five trees. The Gas Department had refused to acknowledge liability. The Committee agreed to spending £85 for replacing the trees, Alderman Boscow remarking that the other Departments should be pressed to pay for the damage.



Hinckley Parish Church floodlighted by Gas during the Hinckley Gas Exhibition.

British Tar Products.

A net profit increase of £8651 to £49,150 is recorded by British Tar Products, which owns a tar-distillation and benzole-refining plant on the Manchester Ship Canal.

Sales have increased by £51,000. The investments have increased from £77,091 to £108,073, with a market value as on Sept. 30 of £101,987. Since the close of the Company's year they have further appreciated.

The Directors recommend a final dividend on the preferred ordinary and ordinary shares of 3¾%, making 10% (same), providing for the Managing Director's commission, and the payment of a bonus of 5% (against 2½%) on the preferred ordinary and ordinary shares, and carrying forward £3217, as compared with £2116 last year. The reserve fund remains at £16,500.

Road Costs and Unemployment.

In the "Financial Times" on Thursday last there was a letter from Lord Jessel in which he expressed the hope that the recent plea of Mr. Reginald Clarry, M.P., for the wider use of British road materials would stir highway authorities everywhere to vigorous action.

"There is," stated Lord Jessel, "no time to lose. Tenders are now being called for next year's road supplies, and some of the contracts have already been let. There is still a tendency in many parts of the country to specify costly materials of foreign origin in preference to home products like tar, which, it is claimed, will build cheaper and safer roads. Local authorities are still using foreign slag and stone—a short-sighted economy that costs the country more in unemployment relief than is saved by cheap buying at cut-throat prices.

"Although road expenditure has necessarily been cut, we cannot afford to neglect our roads, since that will cost more in the end. We must make arrangements for the work to go round; and in the interests both of economy and of local and national employment ratepayers should insist that every penny voted for the roads is spent on 100% British materials."

Benzole Recovery.

The following is a written reply by Mr. F. Blackburn, of Devonport, to the remarks of Dr. G. W. Anderson in the discussion on Mr. Blackburn's paper on Benzole Recovery at the meeting of the Southern Association of Gas Engineers and Managers on Nov. 16—see "JOURNAL" for Nov. 23, p. 565:

With regard to the resin-forming bodies which have given trouble on the district, we have been unable to identify the hydrocarbons with any degree of certainty, but have established that they are of the olefine series. The stripping washer is of ten bays, the last of which is an idler to prevent entrainment of the wash-oil; this agrees with what you have to say regarding the efficiency of washers with a small number of bays.

It is well known that wash-oil becomes polluted with hydrogen sulphide, but up to the present no corrosive effects due to this have been noted. It is our opinion and experience that, in spite of the excellence of the crude spirit, rectification could not be dispensed with and at the same time produce a spirit to N.B.A. Specification. The amount of forerunnings obtained is very small, amounting to less than 1% of the rectified charge. These are passed into the rectified motor benzole, and have an average total sulphur content of 0·7%. The heavy fraction beyond the limit of the specification is returned to the C.W.G. plant to be used for carburetting. The steam consumption of the plant pumps, compressor, and incidental machinery is, as near as can be determined, 22 lbs. per gallon of rectified motor benzole.

I quite agree that the replacement value of the therms removed is to a large degree dependent on the coke market, for this determines whether the therms are to be replaced by coal gas therms or by carburetted water gas therms. If the latter method is necessary, naturally it increases the cost of production of the motor spirit; but even then the practice is undoubtedly remunerative.

Planning for the Future.

On Tuesday of last week, opening an Exhibition at Lincoln organized by the Gas Committee of the City, Sir Francis Goodenough, Chairman of the British Commercial Gas Association, said that the Gas Industry is not content to rest on its oars, complacently enjoying the laurels of the past. On the contrary, it is looking to the future.

"Its technical organization," continued Sir Francis, has been keyed up to a high degree of efficiency. Its administrators, conscious of their responsibilities in the conduct of a vast public utility, have diligently explored, and are exploring, every way in which gas can serve the factory and the office as well as the home. They are planning ahead so that the Gas Industry can take its full share of the trade revival that is surely at hand.

"Not the least important part of the Industry's systematic planning is the adoption of schemes for the training of salesmen, to the end that the consumers (and there are ten million gas consumers in this country) may get the fullest possible service from a national industry in which they have a very material interest.

"Finally, let me remark that, as a national industry, the Gas Industry is deeply concerned that the nation's greatest material natural asset—coal—should be used in the fullest and most profitable way to the nation at large. It must never be forgotten that, even where gas displaces coal, the collier keeps his job. The best way 'back to coal'—that is, back from imported oil to home-produced fuel—is through the gas-works and the electricity generating station, which, between them, enable industry to

obtain heat and power from coal with an increase in efficiency of production, as well as a marked improvement in conditions of labour, and without fouling the atmosphere of our towns and cities."

New Showrooms in the Potteries.

This photograph is of the new Showrooms of the Stoke-on-Trent Gas Department, which were recently opened by the Lord Mayor of the City. The building is floodlighted, and the photograph was taken in the evening. It will be noticed that the gable wall is used for advertising purposes.

The Salerni Process.

We learn from the "Financial Times" that, on Nov. 24, Sir Eric Hambro visited Sheffield and placed with Hadfields, steel makers and engineers, an order for the first commercial retort for the development of the Salerni coal refining process.

The value of the order, which was secured in face of keen competition, is not disclosed, though it is expected to provide an appreciable amount of work and involve the use of much high-class steel of special heat-resisting qualities.

The site for the plant will be decided in the near future, and Sheffield is one of several places under consideration.

Danish Gas Company.

The accounts of the Danish Gas Company for the year ended June 30, 1932, show that the balance standing to the credit of the profit and loss account, after charging pensions, administration expenses, &c., and transferring Kr. 207,485.92 to the redemption accounts, is Kr. 496,870.39. Out of this sum the Directors recommend that a dividend of 6%, or Kr. 8.10 per share, be declared. This will leave Kr. 241,720.39 to be carried forward—an increase of Kr. 8,305.82 on the amount brought in.

A further capital expenditure of Kr. 131,131.35 for additional plant, mains, services, and meters has been incurred during the year, and all necessary renewals and repairs have been carried out, so that the works are in a condition to meet the demands of the coming winter. An extension of the carbonizing capacity has been carried out during the past six months, the cost of which will fall mainly in the accounts for the current year.

The quantity of gas sold during the past year has been 10,713,997 cub.m. (378,586,000 English c.ft.) against 10,054,733 cub.m. (355,291,000 c.ft.) in the previous year, being an increase of 659,264 cub.m. (23,295,000 c.ft.) or 6·56%. The increase is partly due to the comparison with the previous year which was affected by the new system of reading meters.

The Directors' report goes on to state that the retiring Auditors are Major E. A. Critchley and Sir N. E. Waterhouse, K.B.E., F.C.A. Major Critchley, owing to ill-health, does not seek re-election, and the Directors take this opportunity of recording their appreciation of the valuable services rendered to the Company by this gentleman during the 29 years he has held the office of Auditor. Sir N. E. Waterhouse offers himself for re-election as Auditor, and it is not proposed to nominate a second Auditor in the place of Major Critchley, but to appoint Messrs. Price, Waterhouse, & Co., as Deputy-Auditors to act in that capacity should it be necessary.

THE NEWS—continued.

Where Gas Has Scored.

In an article entitled "Gas and Industry" (with the apt sub-title "Unceasing Research and Experiment") in the "Western Mail" for Nov. 23, Sir Francis Goodenough explains that, in the manufacture of tin oxide at Stoke-on-Trent, the use of town gas has had such good results that the bulk of the trade has been recovered from foreign competitors. In South Wales a marked reduction in production costs has followed upon gas-firing for tinplate manufacture. In the pottery trade manufacturers are making an extended use of gas-fired kilns for pottery firing and are finding that manufacturing costs are thereby decreased, that a better class of ware is turned out, and that a more rapid completion of orders is made possible.

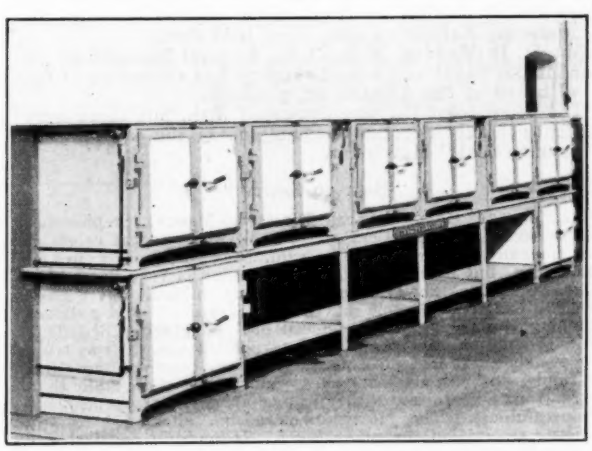
Another instance comes from the works of a large firm of motor-cycle and cycle manufacturers in Birmingham. Some two or three years ago this firm decided to install oil-fired conveyor ovens for japan drying of wheels, mudguards, and the like. Six months ago they replaced oil again by gaseous fuel, and, although this has made a change from an indirect system of heating to a direct-fired system in which the products of gas combustion are in contact with the work to be dried, the results have been as good as those given by the oil-fired heater. Moreover, a material saving has been effected in floor space, and the gas-fired conveyor oven, by reducing labour charges and maintenance costs, is showing a saving of over 4d. per hour as compared with the costs of running with oil.

Varied Uses of the Magnetic Valve.

There is increasing realization of the importance of temperature control in industry—the need for conservation of heat and the necessity in many processes of exact control within very narrow limits. The need has led to the increasing use of the magnetic valve control system in widely different industrial operations. In brief, this system is a thermostat, designed to operate at any particular temperature, causing the energizing of a solenoid which in turn operates a valve.

It overcomes the danger of the fallible human element; it saves labour; it works twenty-four hours a day and effects considerable economies. It controls the flow of water, oil, gas, steam, or air, and is used in Turkish baths, fermenting vats, for artificial tides at the Zoo, in dyeing processes, in the pasteurization of milk, for drying straw hats, for filling ink bottles, in tobacco ovens, soap drying machines, plating vats, for heating generally, and for a score of other special processes besides.

Large-Scale Cooking Equipment on Modern Lines.



Here is a fine "New World" range just completed by Richmonds Gas Stove Company, Ltd., of Warrington and London, and installed in a large hospital in the North of England. The complete apparatus, which measures 24 ft. long, is made up as one unit and consists of eight ovens (each with double doors), all of which are fitted with the Radiation "Regulo" oven-heat controller and direct bottom-flue outlet. It will be noted that the whole range is in "Rado" grey mottled enamelled finish, and constitutes an excellent modern example of gas equipment for large institutions of this kind.

THE NEWS—continued.

Policy of Coal Utilization Council.

At the monthly luncheon of the Coal Industry Society, which was held at the Hotel Metropole, London, on Nov. 21, the recently appointed Director of the Coal Utilization Council, Mr. W. R. Gordon, made a statement as to the policy of that body.

Mr. Gordon said that broadly speaking the work of the Coal Utilization Council resolved itself into two parts—viz., research and propaganda. The first part divided itself into three sections which would have to be dealt with concurrently—market investigation, technical research, and commercial intelligence. One of the reasons for the Council's desire to survey the market before commencing their propaganda was because they wanted to find a common basis of propaganda which, while benefiting the coal trade to the utmost extent, would not conflict with certain other inter-dependent industries which had somewhat unnecessarily taken alarm at the formation of the Coal Utilization Council.

The market investigation would divide itself into (1) A survey of distribution methods, including the handling of the coal at the pithead; systems of land and water transport; the handling and storage of coal at the depôts; and methods of delivery most suitable for varied conditions. (2) Systems of marketing employed by coal merchants and factors; distributors of oil and oil-burning appliances; gas companies; electricity undertakings; and makers of coal burning appliances, the object being to apply as far as possible those methods which had been found most successful. (3) Views of consumers, which would be obtained by personal interviews and questionnaires numbering several thousand, to ascertain what both domestic and industrial consumers of coal required, and whether, as a result of these investigations, it was necessary to advise the coal industry that any existing methods should be altered and, if so, in what direction.

The technical research would involve considerable co-operation with the Fuel Research Board. Involved in the research was the investigation of existing appliances for the industrial and domestic use of coal. Already a score or more of manufacturers and persons interested in appliances for burning coal and methods of treating it had approached the Council and a great deal was hoped for by such co-operation. There would also be research into and encouragement for new and improved coal burning appliances, as well as new uses for coal; inquiry into the preparation, classification, and grading of coals to see how the best methods could be more widely applied, and whether, from the consumers' point of view, it was practicable to go further along the road and towards a simpler nomenclature. There would be investigation of the possibilities of pulverized coal to see whether its scope of employment could be extended; examination of the colloidal fuel problem, including the question whether the oil used in the mixture could be one obtained from British coal; inquiry into methods of carbonization, both high and low temperature; the commercial practicability of hydrogenation; and other important problems such as metallurgical and gas cokes, compressed gas, coal bye-products, tars, benzole, and creosote.

As regards the overseas markets, it was hoped to accumulate a considerable amount of useful information through the co-operation of the local coal trade associations in foreign countries and the Department of Overseas Trade.

In regard to the second part of the work of the Council—viz., propaganda—Mr. Gordon said there would have to be the education of the consumer to burn British coal or its products, thus lowering sales resistance to those on the distribution side.

Recommended Extension of Dyestuffs Act.

The Committee appointed to consider the dyestuffs industry, states the "Financial Times," recommends the continuation of the Dyestuffs (Import Regulation) Act, 1920, on its present basis for a period of three years.

The Committee also recommends that arrangements should be made by an alteration in the method of taxation of motor spirit whereby British dyemakers should be able to obtain their supplies of benzole, toluole, and xylole at prices corresponding to those paid by their foreign competitors.

Two members of the Committee desire the Act to be extended for five years in view of the period usually occupied in scientific research.

The Committee considers that the Act is achieving its main objects and that in its absence the progress of the dye-making industry in the United Kingdom would be impeded.

The Dyestuffs Act of 1920 is included in the Expiring Laws Continuance Bill, which was issued on Nov. 24. The period, as usual, is a year.

The Road Tar Industry and the Coal Trade

The importance of the road tar industry to the coal trade, and the superiority of the all-British product for the making of the safest roads, were emphasized at a luncheon given by the British Road Tar Association at the Park Hotel, Cardiff, on Nov. 24, in connection with the Engineering Exhibition now being held there.

Mr. H. D. Madden, M.Inst.C.E., General Manager of the Cardiff Gas Light and Coke Company and Chairman of the local board of the Association, presided.

The usual toast list was dispensed with, but there were speeches mainly devoted to championing the cause of the "Back to Coal" Movement.

"Back to Sanity."

Mr. Ewart Evans (Local Director, Messrs. Stephenson, Clarke, and Associated Companies, Ltd.) reviewed the origin of the movement. There had, he said, been many criticisms of the slogan, but it had "caught on," and was very difficult to alter. Criticism, however, had not been unkind, and "Back to Coal" expressed itself in "Back to Sanity" and national economy, by using home-produced coal, employing Britishers in its production, and steadying the trade balance. It was truly a movement. It had no constitution other than a Committee, no funds, no bank account, and no offices and staff, other than three Hon. Secretaries, with amazing energy, persistence, and resourcefulness. The movement owed no allegiance to any society, association, or other body. It had no political axe to grind; its sole purpose was to foster by all available means the use of British coal instead of foreign oil. They did not mind if coal was used in the raw form, or as gas, electricity, coke, or other commodities, so long as it meant greater coal consumption. Their object was to secure work for the 80,000 men now unemployed in the Welsh coalfields, 20,000 of whom had been rendered idle in the last twelve months.

Continuing, Mr. Evans said that 2 million tons of tar was made annually in this country, and its superiority for the making of the safest roads was, he believed, unchallenged. Yet tar had to compete with foreign rivals—chiefly bitumen, the product of foreign oilfields. Every gallon of foreign product used on British roads was injurious to the national interest. Road authorities might ask what harm there could be in placing an order for a few gallons of bitumen abroad. The answer was that the 400 million gallons of tar made in this country was, in effect, the result of the labour of a million men—800,000 in the mines and 200,000 in the gas-works and cokeries. On that basis every 400 gallons of tar represented the bye-product of one man's work for a whole year. This calculation might be open to question, so he had obtained figures of local interest. In the Powell Duffryn group of collieries, calculations confined to men who mined coal used entirely in their coke ovens, and those working upon the ovens and bye-product works, showed that 500 gallons represented the quantity of refined tar obtained from one man's work in a year. The margin between proceeds and working costs was so close that a very small item would decide whether the coke ovens remained in operation or not. To his knowledge certain pits were only kept in work by the outlet provided by coke ovens. This made it clear that the placing of an order for 500 gallons of bitumen or other tar substitute abroad definitely imperilled a year's work for one man in South Wales, and 500 gallons represented only about 2½ tons. Road work had often been devised to mitigate the unemployment problem. Surely it was inconsistent to deprive the country of its fullest advantage by buying the material abroad. It was time they gave up the nonsense of keeping the foreigner at work and their own countrymen idle.

Safeguarding the Ratepayers' Money.

Mr. R. G. Clarry, M.P. (Chairman of the British Road Tar Association), said he had been amazed to see in print the statement of a public man to the effect that gas was a rival of coal. On the contrary, gas was one of the biggest friends and assets of the producers of coal. Referring to the presence of many road surveyors, Mr. Clarry said it was only logical that in South Wales they should use the local products exclusively for road-making. Some local authorities were using 90% of tar, and others only 50%. There was no reason why this should be so. Surveyors, as public servants, needed to safeguard the ratepayers' and taxpayers' money, and it was the duty of distillers to show that tar gave better service than imported material, and was also available at a cheaper price.

Mr. John Powell (Chairman of the "Back-to-Coal" Movement) said that the effort to extend the use of road tar was one

which those in the coal trade were glad to support, for by an increased output of bye-products the industry was made more remunerative. Public authorities had a duty to perform in regard to coal and tar.

Mr. E. J. FOTTRELL (Joint Manager, National Gas Council) said that as a representative of one of the greatest public utility concerns in this country he was keenly interested in the "Back-to-Coal" Movement. The great progress of the Gas Industry had enabled coal to be used to an extent, and with a degree of comfort and convenience, which no other country in Europe experienced. Its sphere of usefulness was not confined to domestic consumption; for commercial and industrial purposes it had also made enormous strides. Legislation in regard to the Gas Industry, however, had been such as to delay the progress of gas in the industrial field, but they had reason to expect that in the present session of Parliament gas companies would be relieved of this disability, and could therefore look forward to an ever-increasing development in the use of gas for industrial purposes, and be better able to meet the competition of imported fuel. After referring to the Industrial Gas Laboratory and Showrooms set up at the Bute Terrace Works of the Cardiff Gas Light and Coke Company, Mr. Fottrell said it must not be thought that the coming developments in gas would displace coal. There were certain directions in which coal could not be used, but where gas met requirements and was better and cheaper. One of the greatest obstacles they had to overcome was public apathy. They had to awaken the public conscience to the great necessity for utilizing home-produced fuel.

CARDIFF ENGINEERING EXHIBITION.

Nov. 23—Dec. 3.

Later in the day more than seventy members of the Wales and Monmouthshire Association of Gas Engineers and Managers were officially welcomed at the Engineering Exhibition in Greyfriars Hall by Mr. Angus Scott.

The President of the Association, Mr. Ivor Jenkins, in acknowledging the welcome, said he was glad to note the prominent references in the hall to the "Back to Coal" Movement. Whatever industry they belonged to they were interested in that movement, and the Gas Industry could not do better than adopt the slogan of the Cardiff Gas Light and Coke Company—"The easiest way back to coal is through the use of gas."

With all the facts mentioned in the course of the speeches at the British Road Tar Association's luncheon fresh in their minds, those who had been the guests of the Association were naturally interested in the exhibits which the Committee of the South Wales District Board of the B.R.T.A. (of which Mr. Octavius Thomas, of Pentre, is Hon. Secretary) had arranged to demonstrate the advantages of all-British material in road construction. A qualified chemist was engaged for the purpose of showing the routine method of testing road tars. In the background of the stand is a huge lump of Welsh coal, the source of Welsh tar, and visitors are forcibly reminded that this is "the finest material for Welsh roads," also that "Tar roads are non-skid roads." Two sections of roads are on view, emphasizing the importance of adequate chipping of the road surface after the application of tar. In a showcase are displayed many samples of chemical products obtained from the carbonization of coal.

CARDIFF GAS LIGHT AND COKE COMPANY'S DISPLAY.

In production and other industrial activity controlled heat and a flexible fuel are adjuncts of efficiency. For that reason the demonstration at the Cardiff Gas Light and Coke Company's stand is particularly interesting. For demonstration two furnaces are shown working on town pressure. They are typical of the ordinary purposes in heat treatment of metals. One is running consistently at 1000° C., and there is a salt bath furnace for tempering and hardening. Another application for town gas is shown in the steam boiler, which is capable of giving 500 lbs. of steam per hour. It is a small type of gas-heated boiler which is being used in various parts of the country for steam-raising. The salient features are its automatic control and high thermal efficiency. The central heating boiler is proving an economical unit for heating buildings of all sizes, as well as for dealing with hot water loads for trade purposes. Already a combination installation of these hot-water boilers and steamers is being erected in the city.

Norton's (Tividale), Ltd.—Norton's (Tividale), Ltd., are exhibiting their new improved coke breaker; the Norton automatic tub retarder, which works on the principle of a cataract; and their thermo-pneumatic coal dryer, which travels along a boxed path to a closed chamber, whence the material is carried to the wagons or according to the arrangement of the general plant. Also on view is the Norton-Collins coal dust extraction plant, in which raw coal is delivered into a patented separating chamber and allowed to fall by gravity. It entirely obviates the dust nuisance usually associated with coal cleaning. The initial cost of installation is low, and the upkeep and maintenance costs are quite nominal.

The Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd.—This stand is devised to show the scope of the firm's work as fuel specialists with many years experience of carbonization and other fuel problems. The main exhibit comprises a model Becker coke oven and bye-product plants, which have met with outstanding success. Diagrams and photographs illustrate Woodall-Duckham continuous vertical retorts and intermittent vertical chambers, and an inclined rotary refuse destructor which the company has recently introduced to supplement their vertical shaft destructor. T.I.C. tar treatment plants for the production of road tar and pitch are illustrated, and photographs are shown of Woodall-Duckham waste-heat boilers for waste heat recovery on steelworks or gas-works. This Company's carbonizing plants, erected throughout the world, have a total capacity of nearly 14,200,000 tons a year.

George Kent, Ltd., are exhibiting examples from their comprehensive range of meters for measuring water, steam, air, gas, oil, and other fluids. The water meters cover a range from Venturi metres for measuring bulk water supplies to smaller mechanical meters for metering individual household supplies. Of particular interest to the mining industry is the gate air indicator, specially designed for checking consumption of pneumatic tools. The Kent shunt gas meter is for measuring bulk supplies of gas, and is being extensively adopted as a station meter. It is extremely accurate, small in bulk, and will measure either clean or dirty gas.

The Wales and Monmouthshire Junior Gas Association visited the Exhibition on Saturday, Nov. 26, when they were welcomed by the President of the South Wales Institute of Engineers.

BOOK REVIEWS

The Silkstone Coal Seam*

The Silkstone seam, which has long been established as a first-class coal in the South Yorkshire area, forms the subject of a Fuel Research Survey report issued by the Department of Scientific and Industrial Research. The report is the 25th of a series of papers describing the results of the physical and chemical survey of coal resources of the country, which is being carried out by the Department with the object of making available reliable data that may assist in the better utilization of our national coal resources.

Though best known in the South Yorkshire area, the Silkstone seam extends northwards into West Yorkshire as the Barcelona or Blocking coal, and southwards into Nottinghamshire and Derbyshire, where it is worked at a number of collieries as the Silkstone or Black Shale seam. In the South Yorkshire area, to which the report is confined, the seam lies at a distance of 900 ft. below the Barnsley seam. From its outcrop on the west it has been worked up to a distance of five miles eastwards. Further working developments will probably take place in this direction, and therefore as many samples as possible have been taken from collieries situated at the eastern limit of working.

The Silkstone seam is divided into two parts by a middle band of dirt, which is liable to abrupt increases in thickness. As a result only the upper part is worked at a number of collieries, the lower part being separated by many feet of rock. The part lying above the dirt band consists of two readily distinguishable layers, the upper

* Fuel Research Survey Paper 25. The Yorkshire, Nottinghamshire, and Derbyshire Coal Field. South Yorkshire Area. The Silkstone Seam. Published by H.M. Stationery Office; price, 1s. 6d. net.

called " branch " or " hards " and the lower " top softs," while the underlying part is called " bottom softs."

Each sample examined during this survey was obtained in the form of a pillar of coal cut from the entire thickness of the seam as worked. In the laboratory, samples were prepared from the main subdivisions of each pillar, and a general sample representing the whole seam was made up from the requisite proportions of these. In addition, samples of the four banded constituents—vitrain, clarain, durain, and fusain—were picked by hand from each pillar sample for separate examination.

The report gives detailed results of the examination of 12 pillar sections taken at points spread over the South Yorkshire area. Samples of each pillar and of its main divisions were subjected to proximate and ultimate analysis, determinations were made of the calorific value and of the amounts of soluble and total chlorides, and the behaviour of each on carbonization in the Gray-King assay at 600° C. was studied. In addition, the fusion points of the ash from the whole-seam samples were determined in both an oxidizing and a reducing atmosphere.

Results Obtained.

The amounts of moisture and ash are low, and of volatile matter fairly high. The carbon content is also high and is accompanied by a somewhat higher percentage of hydrogen than is usual in coals of corresponding carbon content. The percentages of sulphur, phosphorus, and chlorides are generally low. With the exception of the samples from one pillar, the cokes obtained in the Gray-King carbonization assay were all highly swollen. In yielding a swollen coke the " branch " differs from the " hards " of the Barnsley and Parkgate seams, which give dense, shrunken cokes. The fusion point of the ash and the calorific value of the coal are high—the latter in some cases exceeding 15,000 B.Th.U. per lb. of air-dried coal.

In dealing with the uses of the Silkstone seam, the Report states that " The portion of the Silkstone seam known as ' branch ' or ' hards ' differs in its physical and chemical properties from the brighter portions of the seam, and hence is removed, usually by hand picking, for marketing as a separate grade. In some cases hand picking is not employed, and grades called ' branch ' will then include the larger sizes of bright coal. The coal is somewhat friable, and, apart from household use, is employed mainly for coking and gas-making purposes."

In some districts, after removal of the " branch " by hand-picking, the coal is sold without further preparation for gas-making, but, in general, washing and screening are carried out before the coal is used for this purpose. Such grades have been found to be satisfactory for carbonizing in both horizontal and vertical retorts, a good quality of coke and substantial yields of other products being obtained.

Silkstone coal is a constituent of the coking slacks used at many bye-product coke ovens in the South Yorkshire area, and, except in isolated beehive ovens, is not coked alone. In ovens of the latter type there is produced a special quality coke which is applied mainly to metallurgical processes. Tests carried out by the Midland Coke Research Committee, considered in conjunction with the results reported for the laboratory carbonization assay, indicate that this coal, on account of its highly swelling nature, may be best applied to blending in order to enhance the quality of coke given by inferior coking coals. Similarly, it is probable that Silkstone coal would not be suitable for low-temperature carbonization unless mixed with a certain proportion of feebly-coking or non-coking coal.

Commercial Education.

It is fitting that among the special contributors to Pitman's Year Book and Diary* for 1933, which is of value to all interested in commercial education, commercial and professional examinations, and office work generally, is Sir Francis Goodenough, who has done so much to further the cause of education. He emphasizes that " the guarantee principle of commerce, on which all policy and practice must be founded and planned if the business is to go forward to continued and increasing success, is that every business exists for the service of the community in general and of the individual customer in particular, and that business relations can only be permanently profitable to the seller if they are also profitable to the buyer. From this it follows obviously that the study of the market—that is, of the needs, desires, customs, and tastes of the individuals comprising the market—which forms such an important aspect of distribution, is vital to success in modern commerce."

The Preface to the book is by Sir Robert Donald, who was Editor of the " Daily Chronicle " from 1902 to 1918; and he pays high tribute to the work of Sir Francis Goodenough. " Second only to the Prince's attempt to make Britain alive to international trading potentialities," writes Sir Robert, " must come the Reports issued by the Government Committee on Education for Salesmanship. . . . I honestly think that, within the short space of three years, there has been a steadily growing agreement with Sir Francis Goodenough's ideals and ideas. . . . Those Reports are worthy of being called the ' Business Man's Bible.' And any young man who is contemplating the conquering of commerce would be well advised to read them thoroughly. There is hardly a point on which he will not find guidance.

* Published by Sir Isaac Pitman & Sons, Ltd ; price, 1s. 6d. net.

NOTES ON PLANT AND PROCESSES

The Jubilee of " Purimachos."

In November, 1882, the first consignment of " Purimachos " was sent to the Worcester Gas Company. This marked the introduction of a new product—plastic fire cement. It was left to the late John Charles Morgan, a member of H.B.M.'s Consular Service, to foresee the need of a cement to replace fireclay and other jointing materials, none of them very satisfactory. On his retirement from the Consular Service in Brazil he returned to this country and commenced the manufacture of " Purimachos "—the pioneer of fire cements.

An instantaneous demand for it immediately followed. During the very first year of its existence markets were found for it, not only in this country, but also in France, Belgium, Russia, Sweden, Canada, and the United States.

Now the products of Purimachos, Ltd., are known and appreciated throughout the world for use in steel works, power stations, gas-works, destructors, and by steamship companies, Government departments, and in industrial works generally. Purimachos is also in daily use in thousands of homes for repairs to domestic fireplaces; it has, too, many other household uses.

The firm was founded in Bristol 50 years ago. The ever-increasing trade at home and abroad later necessitated new and larger premises, and a more modern factory was equipped at St. Philip's, Bristol, where the Company now manufactures " Purimachos " and " Drykos " cements.

Drykos is a synthetically prepared refractory evolved by Purimachos, Ltd., for the treatment and protection of firebrick-work exposed to very high temperatures. All impurities usually found in fireclay have been, as far as possible, eliminated in its manufacture, and, as in the case of " Purimachos," it is supplied in several grades for use under varying conditions and temperatures.

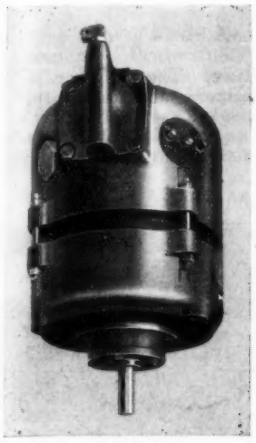
The business was formed into a private Limited Company in 1909, the present Directors being Messrs. G. A. Morgan and A. E. Morgan (sons) and W. R. Crow (son-in-law) of the late John Charles Morgan.

B.T.H. Fractional H.P. Flameproof Motors.

The latest development in connection with B.T.H. fractional H.P. motors is a range of flameproof motors, which has been designed particularly for the electrical operation of kerbside petrol pumps. These flameproof motors are also eminently suitable for use in mines, paint and chemical factories, and in other places where it is essential that flameproof motors should be installed on account of the presence of inflammable vapours. The machines ad-

here rigidly to the designs and tests demanded by the Testing Authority for the specific application in question.

The Mines Department is now the official authority for testing and certification of flameproof apparatus, not only for use in mines, but also for applications in connection with the inflammable gases and vapours encountered in other industries.



B.T.H. Flameproof Fractional H.P. Motor.

Both the A.C. and D.C. motors referred to above have been tested at Buxton by the Mines Department of H.M. Board of Trade with respect to inflammable atmospheres containing petroleum vapours, and are covered by certificates issued by the Mines Department to the British Thomson-Houston Company.

The searching examination which the motors have to pass includes filling the motors with the appropriate highly explosive vapour, and then placing them in a flameproof chamber, which is in turn filled with vapour similar to that in the motor, and sealed. A spark is then generated within the machine, such as could occur normally in practice, and the explosion thus caused inside the motor must not ignite the surrounding vapour in the chamber.

The A.C. machines are of the repulsion-start induction type, while those for D.C. circuits are of the compound wound type. All the motors are equipped with ball bearings, and their mechanical and electrical design is of the highest possible character.

The motors can be supplied for vertical mounting, and motors for horizontal mounting are in course of development. The machines incorporate a double-pole tumbler switch of robust character in the flameproof casing, the switch being actuated by a push rod operating in a flameproof traverse. This feature is of great interest, since it saves the extra expense of providing a separate switch in a flameproof casing, and also effects considerable economy in space.

A New Parkinson Cooker.

From our advertising columns it will be seen that the Parkinson Stove Company, Ltd., have introduced a new type of modest-price gas cooker, the "Birma," which is a striking advance. Its originality is due to careful study of the needs of the user of the cheaper simple hire or slot type, and of the daily problems of the gas engineer as to service and maintenance.

It is of simple cast-iron frame construction with inner and outer enamelled plate panel sheathing enclosing special moulded insulating slabs which conserve the heat.

The door and side panels are free from mouldings which collect dust and dirt, and they can be cleaned in a few seconds. There are no projecting supply pipe or tap junctions, and a continuous door hinge is fitted.

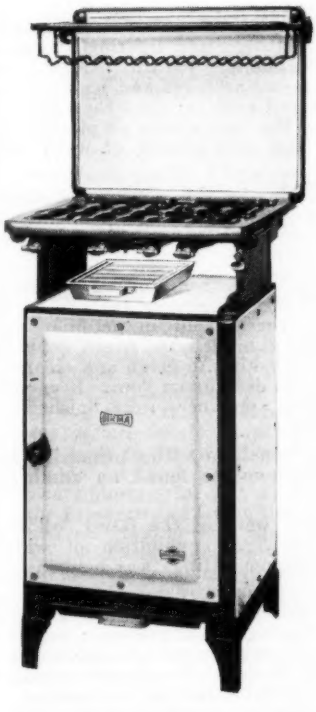
But the really outstanding feature of the "Birma" is the easily detachable door and enamelled side panels. These panels, which are secured by recessed rustless screws, can be removed for cleaning, dismantling, and re-assembling, and the cooker re-conditioned with a minimum of labour and cost. Gas undertakings having their own repair or reconditioning shops, either large or small, will appreciate how easily the "Birma" can be renovated. The cooker can be made to look and to be as good as new at small cost in any repair shop.

If the enamelled panels are in good condition, they can be replaced after the carcass has been cleaned. Should any panels be damaged, new standard panels can be obtained at trifling cost. This is a contribution to economy in capital outlay and especially in reducing maintenance costs.

The oven is of modern two-burner type, enamel lined and provided with swinging gates for quick cleaning. The oven door is fitted with new cam action latch and a modern plate rack and splash plate are fitted when required.

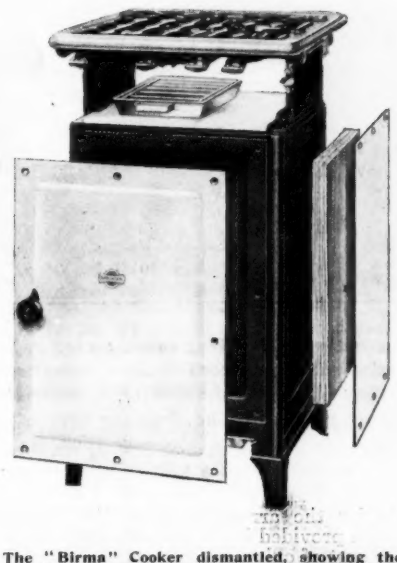
In addition to the "Birma" model, there is also the "Birma X," which has been designed for those who require a black cooker showing the maximum amount of white enamelled door and side panels with the minimum of visible cast iron. In the "Birma X" the door has a raised panel and embodies an alternative concealed method of securing the side panels.

The ingenuity shown in this new "Birma" promises to solve maintenance problems in a new way.



The "Birma" Cooker with plate rack and splash plate.

The New "Birma X," which is without splash plate and has an alternative method of securing the detachable enamelled panels.



The "Birma" Cooker dismantled, showing the way in which the panels are detachable and the moulded insulating sheets, which are separated from the carcass.

A NEW PARKINSON COOKER.

Gas Equipment in the Home Beautiful

Ideal Home Exhibition at Swindon

" Ideal Home " Exhibitions are sometimes inclined to be ordinary and stereotyped. A special Home Exhibition organized in Swindon recently, however, struck a new note as far as colour arrangements, modern furnishing designs, and original labour-saving appliances were concerned.

Organized by the Swindon United Gas Company in conjunction with Mr. J. Spiller and Messrs. Bays & Co., of Old Town, it effectively combined beauty with utility. New ideas in furnishing and design, for instance, had been evolved; original lighting effects and heating arrangements were introduced into each room; and colour harmony was maintained even to the tints of the frameless pictures, the window drapery, and the modernist, geometrically designed carpets.

Two similar exhibitions which were held at Wroughton and Stratton some little time ago proved to be popular innovations and attracted a large number of visitors; but they were planned primarily to interest the middle-class housewife in economical furnishing schemes and inexpensive labour-saving gas appliances, while this new " Ideal Home " had been planned regardless of cost and with the sole object of illustrating the artistic possibilities of the most commonplace " useful " article.

The house, floodlighted by gas, was an old one which had been completely modernized. Each room was so treated as to enhance its good points and disguise its unattractive ones.

The gas appliances, all in coloured enamel to tone with the general schemes, combined labour-saving with beauty of line and design. Modern fireplaces were installed in each room by Messrs. Bays & Co., who were also responsible for the arrangement of the thermal storage system which provided hot water throughout the house at an average cost of only sixpence a day.

An angle of the dining room, giving an idea of the warmth and light introduced into a once cold, dreary room, through the introduction of appropriate furnishings and colour schemes. The fireplace here is in bronze on deep orange tiles.

The dining room, pictured here, faced north, and so warmth, colour, and light were introduced through the medium of deep cream walls, vivid orange drapery, and rich shades of russet oak furniture. The fireplace picked up the oranges and reds of drapery and furniture, the general colour scheme being extended even to the books in the low, glass-fronted bookcase, and the tints of the modern pictures accentuating the attractive plainness of the walls.

A peep at the best bedroom showing a corner of the cheval wardrobe, the modern dressing table, and the new " Curvex " fire.

The lounge was carried out in soft shades of green and walnut, with the fireplace, fittings, and lighting arrangements planned to tone. The china in the tiny cabinet, the glassware, the original alabaster ashtrays and bookstands, the mass of modernist designed cushions, and the effective and elusive check pattern of the carpet were all planned to tone with the greens, creams, and browns of walls and furnishings.

Opening out of this was a tiny breakfast room. Fireside chairs and moorland pictures gave this room a " homely " atmosphere which was accentuated by the old-world oak-effect gas fire setting.

The general scheme of the largest bedroom was in ivory and old rose, a " Curvex " fire completing the effect. A bachelor's combined room, carried out in petunia, was fitted with a gas fire finished in delicate green enamel. The spacious kitchen was carried out in green and cream—cream enamelled furniture and deep green floor. Economical gas cooking and washing appliances were finished to tone with the general scheme.

Gas irons and a series of small novelties primarily designed to lessen labour and expense found an admiring public.

The lighting arrangements were of the latest, all the lights being switch-controlled. An exhibition of water heating appliances and bathroom fittings was held in the conservatory.

A phase of activity at this ideal home which aroused particular interest among the women of the town was the series of cookery demonstrations given in the large kitchen each day by Miss Sketchely, M.C.A. On several occasions the attendance was so heavy that crowds of visitors had to be turned away owing to lack of accommodation. Such, indeed, was the success of the exhibition that the visitors' book shows an average attendance of more than 750 each day during the fortnight it was open.

Gas Companies' Protection Association

Thirty-Fifth Annual General Meeting

The Thirty-Fifth Annual General Meeting of the Gas Companies' Protection Association was held at the Caxton Hall, Westminster, on Wednesday, Nov. 23—Mr. R. W. EDWARDS, J.P., C.C. (Chairman), presiding.

The ACTING SECRETARY (Mr. R. Girdlestone Cooper) read the notice convening the meeting, together with the minutes of the last General Meeting, which were confirmed.

CHAIRMAN'S ADDRESS.

In moving the adoption of the Report and Accounts, the CHAIRMAN said:

Before dealing with the general business of this meeting, I know you will wish me to refer to the loss which the Association has suffered in the death of Mr. F. E. Cooper. Mr. Cooper had been our Secretary since 1898, when the Association was originally formed, and throughout the whole period of its existence his willing services and capable advice have been of great value. He was still at work towards the end, and I cannot help thinking that this was as he would himself have wished. The fact that he was so recently working with us adds to our feeling of personal loss.

I know that you will join with me in expressing to his widow and son our sincere sympathy, and I will ask you as a mark of respect to stand for a moment in silence.

Turning to the finances of the Association, the accounts for the year to Sept. 30 last have been in your hands for some days, and you will no doubt have noticed that the revenue account leaves a good credit balance. We should realize, however, that this balance is much more favourable than can be looked for in normal years.

Your Committee were of the opinion that the Association should, like the great majority of other holders of 5% War Loan, assist in the success of the greatest conversion operation ever carried out. Thus the receipts include a non-recurring item in the Conversion Bonus, and as from the end of December our income from War Loan will be substantially less. Monetary conditions have also reduced Bank Deposit receipts almost to vanishing point, and we cannot expect a generous yield from any new investments made, while the present financial atmosphere continues.

You will note that the Association's assets now amount to £2800 odd.

UNITED ACTION.

Two years ago I expressed the opinion that only united action by the whole country could ward off general disaster; and when we again met last November, we had just experienced the spectacular election success of a united National Government. The position since then has remained critical, but the tendency towards a land-slide seems to have been effectively checked.

We cannot hope for any sudden movement from the downward path. The ship of state is too massive to respond instantly to the movement of the helm, and, like any other great ship, will still slip sideways towards the rocks, even after the man at the wheel has begun to bring her head round; nor can we hope for the troubles of a great exporting and shipping nation to be wholly cured by internal operations, while economic sickness remains general in other parts of the world.

In my own view, there are signs that other nations will, sooner or later, regain their normal health. Recovery will no doubt be slower in the case of those countries which allow the disease to run its course, yielding to the natural cure of time, than in those who, like the British Commonwealth, are firmly adopting methods of mutual assistance and freer trading conditions.

I do not think we should take too narrow a view of our own Industry, for just as world economic conditions affect the prosperity of Great Britain, so in turn the conditions in this country govern the purchasing power of our own domestic and industrial consumers. Thus, although our Industry is to some extent a sheltered one, we cannot help feeling the repercussions of the general depression.

The outlook for by-products is even gloomier than last year. The bad market for tar may be due in part to restriction in expenditure by local authorities, and the increased use of concrete is another adverse factor; but competition by imported bitumen and asphalt products is no doubt the chief cause of the trouble.

It is an interesting fact that, while many highway authorities use vastly more bitumen than tar, others appear to find the general use of tar and tar emulsions the more satisfactory. If those Councils who at present favour imported bitumen would increase their use of tar, they would, without loss to themselves, help to reduce both the adverse trade balance and the number of British unemployed.

As you know, the Local Government Act of 1929 has now made County Councils responsible for the maintenance of hundreds of thousands of roads in Rural Districts. It is in such districts that concrete is least used, and it may be hoped that the County Authorities—being larger and more responsible bodies—may be more easily awakened to the fact that the use of British tar is patriotic and in the best interests of the country, while the use of foreign bitumen is not. If individual members of County Councils would appreciate this fact and see that their officials are instructed accordingly, they would be doing a practical service both to the coal and gas industries and to this country.

The coke market is still being depressed by the large production of furnace and oven coke, which is surplus to the greatly restricted demands of the iron and steel trade.

The recently published returns for October show a general tendency towards recovery in various branches of the heavy industries, and we sincerely hope that this tendency may lead to prosperity in the not too remote future.

The outlook for sulphate of ammonia is exceedingly bad, and some companies have found it less expensive to pay contractors to remove and dispose of ammoniacal liquor rather than to incur the loss of working up and selling sulphate. This is largely due to underselling by manufacturers of the synthetic product, and perhaps also to the heavy falling off in the purchasing power of agriculture.

COMPETITION AND SALES OF GAS.

In the sale of gas itself, the keenest competition is encountered from foreign sources, in the shape of imported oil, as also from electricity. In the field of electrical competition, I have every confidence in the power of the Gas Industry to hold its own, always provided—and this is a matter of the first importance—that we are given freedom to do so.

We do not ask for state propaganda, nor for the formation of national schemes, but it is reasonable to expect some relaxation of the rigid and out-of-date forms of control which still exist.

The great improvements which have been made in oil-burning apparatus, and the cheapness of imported paraffin, have materially changed the conditions under which we are now supplying. Even the declining use of solid fuel is being bolstered up by new inventions. No less an authority than Sir John Cadman, speaking in Texas on Nov. 16, is reported to have said that the oil industry to-day stood on firmer ground, and had before it a more open path than almost every other industry in the world.

Undoubtedly the expansion of electricity supply has contributed to some degree to the changed conditions, and the electrical industry has certain inherent technical advantages for which there is no counterpart in the Gas Industry. The adoption of alternating current has enabled high tension transmission to simplify the inter-connection and growth of distribution systems, and we are now all too familiar with the power lines which are run across open country, without reference either to the positions of existing highways or to problems of reinstatement.

The pylong-hating protestors of the South Downs and the New Forest would be struck dumb (if such a thing were possible) at the bare suggestion of miles of main trunk gas mains being slung across the country 30 ft. in the air. For us overhead mains will never become a means of reducing overhead expenses, and this is a handicap which must be faced by gas. It is one of which we cannot reasonably complain, but we do ask—and with justification—to be allowed to attract new, and to hold existing, consumers against the increasingly tempting alternatives of electricity and oil.

There is an extraordinary refusal to realize that under present-day conditions no gas undertakers in the land can hope to gain financially by charging exorbitant prices. Their consumers would merely adopt the cheap alternative supplies which are continually thrust before them. The only practicable method of increasing revenue is by a quantitative increase in sales. This necessarily implies not more onerous but more beneficial—more tempting—rates and methods of charge.

Nothing is more striking than the way this has been recognized by the electrical industry and the Electricity

Commissioners, and the old flat rates are being rapidly superseded by new and more attractive systems of charge.

Financial and Administrative Co-operation.

A factor which should tend towards the reduction of costs, and therefore of charges, is the possibility of effecting financial and administrative co-operation, and joint working between gas undertakers themselves. For this we must have two things—freedom to co-operate without expensive and obstructive procedure, and, what is equally essential, the will on the part of the personnel of individual undertakers to work in with their neighbours to the advantage of both.

For many reasons, gas supply in the past has been on somewhat parochial lines, and we must not be blind to the fact that, if we are to keep abreast of the times and maintain the vitality of the Industry, we must meet new conditions with a new and wider outlook.

Many of you will be aware of the difficulties which the existing procedure has imposed upon a large gas undertaking in the West of England. An application was made under the Gas Regulation Act for a Special Order authorizing the acquisition of two neighbouring undertakings, and providing for multiple basic prices for the combined area.

The terms of transfer and the basic prices were as agreed with the Companies and the Local Authorities, but the making of the Order was refused unless the multiple prices were replaced by a single basic price. Although this was acceptable to the promoters, it was recommended by a Select Committee of the House of Lords that multiple prices were the more appropriate. This resulted in an unfortunate deadlock, and it was only last week that the Order was finally approved by the Upper House, the demand for a single basic price having been abandoned.

All the Companies concerned, and their respective consumers, had approved the proposals, and the differences between the powers that be were not of their seeking.

Last year I spoke of the Government Committee which had been appointed to consider and report on new gas legislation. Had their work not been interrupted by political developments, their final report would, no doubt, have been published before now.

An Interim Report was issued in March last, dealing with the question of investment by undertakings both in each other and in allied industries. Since then the facilities recommended have been granted to the Industry in the Gas Undertakings Act, 1932. The extent of the investment power is strictly limited, but a useful method of effecting minor co-operations and mutual interests is now available.

A further report is anxiously awaited by the Industry, but as I have myself the honour to be a member of the Committee, I cannot, of course, anticipate its publication.

If new legislation is to be approached on the footing that the controls and restrictions of a Government Department are as essential to-day as they were in 1847, any resulting proposals may be expected to prove a disappointment to those having a more up-to-date outlook.

The Salter Committee.

A recent matter of considerable public interest is the issue of a Report by the so-called "Salter Committee." Suggestions had been put forward that public utility undertakings should be made to bear an increased proportion of the cost of highways. Through the Conjoint Conference it was pointed out that such undertakings already bore a relatively heavy share of this cost, and the suggested increases received no support in the Committee's recommendations.

It is not generally realized that, in addition to contributions through the local rates, supply companies are obliged to pay the entire cost of making good all road openings, and that they do, in effect, greatly lessen the need for heavy road traffic by providing underground transport.

The consumption of raw coal means the delivery of supplies by lorry in nearly all cases, whereas if it is used in the form of gas, it is normally shunted straight into the works. From that point its distribution cannot add either to traffic congestion, or to the expense of surface maintenance. In strong contrast to this are the methods of distributing fuel oil and spirit.

If effect is given to the proposals for increased taxation of road vehicles, gas undertakings will, no doubt, suffer somewhat in connection with their transport for the distribution of coke and other purposes, but they will be affected to a relatively small extent in comparison with most other users of the roads.

Parliament during the past twelve months has been too busy dealing with the national crisis to give much time to legislation of special concern to the Industry, but there are one or two measures which should be referred to.

You will have noticed that the present Government is apparently a willing step-parent to the London Passenger Transport Bill, since the measure has been carried over from last Session. The protective addition and amendment which we obtained last year, should prove a necessary safeguard in the wide area covered by the Bill, and a valuable precedent for use elsewhere.

A Bright Spot.

Probably the only bright spot in the otherwise depressing Finance Act of 1932 was the increase in allowances in respect of depreciation for plant and machinery, and perhaps even this appears bright only by contrast with the otherwise forbidding aspect of this latest taxing statute. Members have had the effect of these provisions pointed out to them by the Association, and assistance in individual cases was also given.

The provisions as to Land Tax in the first Finance Act of 1931 were the subject of strong representations by this Association, but in view of the fact that the new Land Tax has now been indefinitely postponed, there may be a further opportunity, to pursue the question of distinction between statutory and non-statutory undertakings, if and when it is proposed to put that part of the Act into effect.

The wording of the Finance (No. 2) Act, 1931, created a problem of considerable difficulty in connection with the deduction of income-tax by companies whose dividends are subject to effective control. The Inland Revenue were approached by the Association, among others, but were non-committal rather than helpful. The facts were therefore communicated to members, who have dealt with the matter according to their individual circumstances.

The recent measure of most direct importance to gas undertakers is the Kettering Gas Act, 1932. Its preamble recites that the Kettering Urban District Council are the electricity supply undertakers, and are authorized to charge the general rate with any loss on the electricity undertaking, and that they have partly—and in some cases wholly—prohibited the use of gas in any of the thousand newly-built Council houses. The Act then makes void and unenforceable any condition imposed by the Council upon their tenants as to the form of light, heat, and power used, or as to the source from which it may be taken.

It is clearly not equitable that any public authority should be allowed to make the building of houses with public funds an opportunity to give to their own electricity undertaking special privileges for which the gas undertakers are not allowed to compete.

Coal Mines Act.

We have now had some experience of the working of the Coal Mines Act, 1930, but opinions as to its effect are by no means unanimous, even among mine owners. The provisions of Part I. are proposed to be continued for a further 5 years, and it is reported that the Central Council of Mine Owners met last week to consider amendments of existing marketing schemes. These amendments may have far reaching results. They include what is, in effect, an export levy; they would provide separate quotas for inland and export markets, and also for deliveries within the district, and inland deliveries elsewhere.

An even more startling proposal is that different minimum prices should be imposed for the same class of coal "according to the market." The balance of opinion in the coal industry appears to be in favour of continuing control with some or all of these proposed amendments, and the Gas Industry naturally feels some anxiety as to the effect on the supply of its raw material.

I cannot help thinking that there is a tendency on the part of mine owners to regard the Gas Industry as one of their keenest competitors. In effect, we are nothing of the sort, since our one object is really to sell the maximum quantity of coal in the form for which there is a great public demand. The days of raw coal consumption for domestic and many other purposes are numbered.

It is only in the forms to which it is converted by gas and electricity undertakings that British coal can hope to compete successfully against oil lighting and heating, oil cooking, and oil and petrol engines.

Gas is still opening up new means of maintaining the demand for coal, and we have lately read of most successful demonstrations, at Birmingham, in the economic use of compressed gas as a motor-car fuel. Experiments have proved that it is possible, by means of cylinders and suitable compressor plant, to dispense with the bulky balloon containers with which we became familiar during the war, and running costs should compare not unfavourably with those of motor spirit at its present price.

I understand that both in London and in the North of England similar experiments are being carried out, and are receiving encouragement from official sources. It is not difficult to visualize the time when roadside filling stations will, as a matter of course, stock standard gas cylinders

ready to exchange for empties, which will be re-charged by small compressor plants on the premises.

As long ago as 1918, I obtained for my own Company statutory powers to maintain roadside standpipes for supplying motor traffic, and it may not be long before this unusual power is widely sought in a more modern form, to provide for the supply of compressed gas.

The tremendous growth of road traffic at the expense of the railways must have been an important factor in reducing coal, and increasing petrol consumption, and it seems not impossible that these experiments may pave the way for a reversion to coal as the prime source of power for mechanical transport. Even on the railways themselves, raw coal is losing its hold, but the innovations of the Diesel and the motor locomotive might have become far more general had not electricity given the mine owners such a successful alternative means of using coal-produced power.

There is an Arab proverb, "I and my Cousin quarrel, but it is I and my Cousin against the world." I cannot do better than suggest that the coal and electricity interests should digest that saying, in conjunction with Sir John Cadman's forecast for the oil industry.

Highway Problem.

The hardy annual of the highway problem still calls for some mention, and it is understood that the difficulty in obtaining what might be called a revised and agreed Maybury Clause, is due to the failure to settle differences of opinion among highway authorities. This is a matter especially within the province of the Conjoint Conference of Public Utility Associations, of which this Association is a constituent member, and, from our point of view, it could not be in better hands.

I have already referred to the increased highway powers given to County Councils by the recent Local Government Act, and this, by the elimination of Rural District Councils, may be expected to facilitate an ultimate agreement. One effect, however, seems to have been that County Councils have attempted to impose upon undertakers forms of special agreements, whereby undertakers would be required to contract out of their existing statutory rights and powers. I need hardly say that when agreements of this sort have been brought to the notice of the Association, its members in the areas concerned have been advised to retain their statutory rights.

The technical committee of the British Standards Institution has recently drawn up a draft specification for steel spigot and socket pipes for gas, water, and sewage, and the Association has been ably represented on this Committee by Mr. W. Phillips, of Luton. Thanks to his efforts, and to those of other representatives of the Industry (who were assisted by tabulated information from members of our Association), the objection by the steel pipe manufacturers to the use of coal tar in any coating composition, was successfully overcome.

B.I.F. Joint Conference.

A Joint Gas Conference is to be held next year in connection with the British Industries Fair, and the Association has agreed to co-operate on the Committee, being represented by the President, the Vice-Chairman, and myself. There is no doubt that this Conference should prove of benefit, both to the individual undertakings whose representatives attend, and to the interests of the Gas Industry in general. Certainly there can be no industry at the Fair who can claim to be more wholly British.

Another Committee on which the Association is to be represented, is that formed by the Institution of Gas Engineers in connection with a memorial fund for the late Sir Arthur Duckham. I need not say that he was a wholehearted and powerful friend to the Gas Industry; to many of us his death has been a matter of personal sorrow also. The Association's representatives are the Vice-Chairman and myself.

As usual, individual advice and assistance have been given by the Committee and officers on a large number of matters, and these are mentioned briefly in the Report. In this connection I should like to record our thanks for the work done by members of the Committee, and also to those who have acted as our representatives on various bodies.

The Association has a long record of useful service, and is the only body which represents company undertakers, as such. I can say with confidence that our representatives have been well qualified to maintain the standing and prestige of the Association.

I now formally move that the Committee's Report and Accounts for the year to Sept. 30, 1932, be approved and adopted, and that the Report be entered on the Minutes.

Gas Legislation.

Mr. Reginald G. Clarry, M.P., seconding the adoption of the report and accounts, first associated himself with the Chairman's remarks regarding the loss the Association and the Industry had sustained in the death of their Secretary, Mr. F. E. Cooper. It seemed strange indeed for them to meet without him after his long connection with the Association. Mr. Clarry went on to congratulate the Chairman on his admirable survey in the address he had just given them, which covered a wide and important field. They would, perhaps, like him to refer to two or three points from the work of the past year, and he would first mention two matters in regard to gas legislation in the House of Commons, which were landmarks in the Gas Industry itself. He happened to have first-hand knowledge of both. The Gas Undertakings Act, 1932, in reference to powers of investment, was, strangely enough, a private member's Bill, brought in by Lord Bridgeman, and when it came to the Commons Mr. Clarry himself piloted it through. It was, nevertheless, a farce that first-class legislation for an industry of their importance should have to rely on a private member's Bill to become law. But if this were the only way they could get their shackles knocked off they must adopt it.

The other matter was in regard to the Kettering Gas Act. A private Bill, said Mr. Clarry, did not in the ordinary course of events come on to the floor of the House of Commons, but it was possible for it to be objected to time after time, and one objector was sufficient to stop its progress, until the situation became almost intolerable; and then the Chairman ordered the Bill to be put down for debate in the House. That was how this Bill came to be discussed on the floor of the Commons. The objectors on each occasion to the Bill were whipped up for the purpose of the debate, and a large number of members had been circularized to oppose the measure. So that when the time came for the Bill to be considered there was, superficially, a large majority in favour of rejecting it. The bulk of the members had in their pockets requests, which amounted to demands, to oppose the Bill—so that it started off in a most unfavourable atmosphere. But the opposition was worn down, and, although by the end of the debate, which lasted three hours, the measure was challenged for a division, the meagre number against it enabled it to pass finally without a division, and it became a unanimous vote. This had been very good for the Industry, and it had made the House of Commons more amenable to gas legislation for the future. So the past year had been a particularly good one for the Gas Industry.

As to the powers granted to gas undertakings in regard to investments, it was up to the Gas Industry to make the fullest possible use of this Act; and they might look forward during the next few years to the knocking off of more of their shackles.

The Tar Situation.

He was very glad, continued Mr. Clarry, to hear their Chairman's reference to tar in connection with by-products. It was safe to say that tar was the most stable of their bye-products at the present time in so far as price and return were concerned. They had been able to call to their aid a British product in the "Buy British" campaign and make the fullest possible use of it. It was very strange that some county surveyors looked with the gravest suspicion upon tar, while there were others with whom tar represented over 90% of the road dressing used. If it could be used with advantage in some traffic conditions, there was no reason why it could not be used in others, and at the same time it was of benefit to the particular locality in which it was used. One penny per gallon on tar represented on the whole production of the United Kingdom an amount of £800,000—which in its turn redounded to the advantage of almost every home in the United Kingdom in the price of gas. The matter was also closely allied to the question of imports of bitumen and the oil used to produce this bitumen—and therefore the imports of foreign oil. There were on foot many movements to draw the public attention to the foreign oil imported into the country, and its effect on the large number of unemployed miners in the country. It therefore behoved them to do all they could to make use of their national product.

The resolution was then put to the meeting and carried unanimously.

Election of Officers and Committee.

The election of Dr. Charles Carpenter, C.B.E., as President of the Association for the ensuing year was unanimously agreed to on the proposition of the Chairman, seconded by Mr. D. H. Helps (Reading), as was also the election of Mr. Clarry and Mr. A. A. Johnston as Vice-Presidents, on the proposition of the Chairman, seconded by Mr. F. J. Bradfield (Commercial Gas Company).

Mr. W. Phillips (Luton) proposed the re-election of the retiring members of the Committee of the Association, and

this was seconded by Mr. G. W. ANDERSON, and carried unanimously.

The Hon. Auditors (Messrs. W. A. Scott & Co.) were also re-elected with a hearty vote of thanks for their services in the past year, on the proposition of Mr. R. J. AUCKLAND (Cardiff), seconded by Mr. H. C. HEAD (Winchester).

VOTES OF THANKS.

The CHAIRMAN then proposed a hearty vote of thanks to Mr. R. G. Cooper, the Acting Secretary, who had most efficiently carried the burden of the work during the year.

This was seconded by Mr. CLARRY, and carried unanimously.

Mr. COOPER, in reply, thanked the members very much, saying that he had been connected, unofficially and officially, with their Association for about twelve years, and he took a very great interest in its work. The example set by the Committee in giving their support, and by his father before him, was one he would endeavour to follow.

A vote of thanks to the Chairman on the proposition of Mr. PHILLIPS, seconded by Mr. BRADFIELD, concluded the business of the meeting.

IN CONTINENTAL COUNTRIES - - -

Abstract Translations from the Technical Press of France and Germany.

ECONOMICS OF HIGH-PRESSURE HOLDERS.

The subject of gasholders of the high-pressure type is treated exhaustively with the help of formulæ and charts by Dr. Segelken in "Das Gas- und Wasserfach," 1932, 75, 885-890 and 904-908 (Nov. 5 and 12).

Whereas in the case of holders of the normal low-pressure type the storage capacity is the cubical volume between the water level and the dome at its highest position or between the base and the disc at its highest position, and is dependent only on the dimensions of the holder, in the case of high-pressure holders the storage capacity is the product of the cubical capacity and the working pressure range in atmospheres.

The costs involved in the installation of high-pressure holders are made up of (1) the cost of the holder, (2) the cost of fittings which may generally be reckoned as a fixed percentage on the cost of the holder, (3) the cost of the governors, foundations, housing, &c., which depend on local conditions, and (4) the cost of a compressor plant.

The cost of the holder is essentially proportional to the weight of the metal contained in it, and this depends on the shape, size, pressure ratio, and type of construction, and also on the nature of the metal. The possible shapes are a horizontal cylinder with hemispherical ends, a sphere, or an ovoid. The main advantages of a cylindrical shape are the possibilities it affords of despatching to its destination by rail a complete holder or the holder in large sections, and of employing the available ground space to good advantage by arranging the holders parallel to each other. The first advantage can, however, only be realized if the maximum shell diameter is rather less than 10 ft. and the cubical capacity is limited to 3500-5000 c.ft. Actually, however, cylindrical pressure holders have been built with shell diameters as great as 25 or even 38 ft. and storage capacities as high as 350,000 c.ft. In the latter case, the shape approximates to that of a sphere, and this shape is, in fact, preferable in the case of larger holders since it gives the smallest weight in relation to capacity.

The question of weight and capacity is considered. The thickness of shell required is proportional to the "Diameter-pressure"—*i.e.*, the product of holder diameter and maximum storage pressure—and is shown to be only half as great with spherical holders as it is with cylindrical holders.

The specific storage weight (*i.e.*, weight of metal per unit volume of storage capacity) is proportional to the product of three factors:

(1) A factor depending on (*a*) the physical constants of the metal employed as affecting the stress to which it can be subjected, and (*b*) the method of construction, whether riveted or welded.

(2) A pressure factor equal to $\frac{\text{maximum storage pressure}}{\text{working pressure range}}$ and approximating to unity under most present-day conditions of use.

(3) A shape factor $\frac{12A+6}{3A+2}$ where A is the ratio of the length of the cylindrical portion of the holder to the diameter. The shape factor ranges between 3 for spheres and 4 for infinitely long cylinders.

The mutual relationship of these factors is shown graphically.

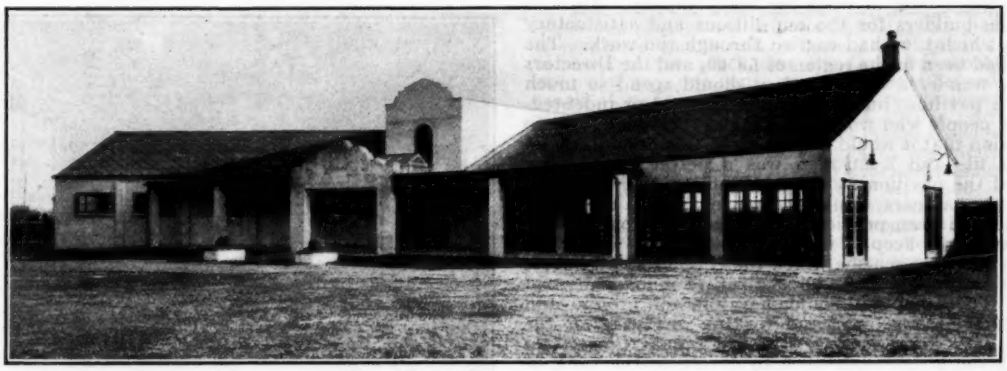
The specific storage weight is not dependent on the actual diameter of the holder. The simple relationship expressing the specific storage weight is affected in certain ranges by influences associated with a critical diameter-pressure and arising out of the fact that the minimum permissible thickness for the shell of a pressure holder is 0·28 in. The critical diameter-pressure is calculable. If the actual diameter-pressure is lower than the critical value, 0·28 in. plates must nevertheless be used, and the specific storage weight is increased, being then proportional to a shape factor $\frac{1+A}{3A+2}$ (ranging between 0·5 for spheres and 0·33 for infinitely long cylinders) and inversely proportional to the diameter-pressure. It is then no longer independent of the diameter.

The specific cost (cost per unit of storage volume) of a pressure holder of optimum design is closely related to the specific storage weight.

The pure specific cost is generally less for pressure holders than for ordinary or waterless holders up to a storage capacity of 350,000-420,000 c.ft. provided that the critical diameter-pressure is exceeded. If this is not the case, the range over which the advantage lies with the pressure type is reduced progressively as the storage pressure increases. When other factors are taken into account, the useful field of high-pressure holders is increased or reduced according as the diameter-pressure exceeds or falls short of the critical value. These other factors, which are fully discussed in relation to pressure holders and other types of holder, include painting costs, accessibility, corrosion, suitability for handling dehydrated gas, loss of calorific value, &c.

The question of compression costs is complicated, and much depends on whether the gas is to be distributed under high pressure (*e.g.*, for supply to feeder mains or for use in furnaces) or under low pressure, *i.e.*, on the fact whether the compression costs can justly be debited to the holder. Where pressure holders are intended to serve solely as a means for storing gas, considerable economies can be effected by the use of a series of, say, three holders in parallel with each other and with the gas outlet main of the works in place of a single holder in the main gas stream worked on the in-and-out system. The holders can then serve separate functions—*e.g.*, one as a pure reserve, one for taking care of daily fluctuations in demand and one for taking care of fluctuations over a period of several days or a week. When such a scheme is adopted, only a fraction of the total gas passes through the holders, and consequently only that fraction needs to be compressed. An additional possibility which such an arrangement offers is that of working the compression plant only at night, whereby power is consumed only at off-peak periods.

Croydon Gas Company Open New Sports Pavilion



THE NEW SPORTS PAVILION.

As the culmination of a scheme, which extends back over a considerable period, to provide adequate sports facilities for their employees, Mr. William Cash, Chairman of Directors of the Croydon Gas Company, declared open a very fine new pavilion on the Company's sports ground at Plough Lane, Wallington, on Saturday, Nov. 26.

The ground, which was purchased by the Company in 1921, is some eight acres in extent, and provides two football pitches, two cricket pitches, three tennis courts (at present in course of conversion from grass to hard), six full-size bowling rinks, and a putting green. The new pavilion amply provides for all the requirements of these sports, and in addition embodies a delightful tea room, which is so designed that it can be used for dancing or other social functions.

The building was specially designed for an internal angle corner site, the two wings fitting on to a central octagonal entrance hall, from which radiate the tea room, ladies' and gentlemen's dressing rooms, main cloak room, and kitchen, with a verandah formed on the front. The architectural treatment of the plan has been very simply expressed, and only plain materials have been employed in the construction, but the result shows what can be done with skilful planning and choice of colour and furnishings.

There is a servery direct from the tea room into the kitchen, which is fitted up with the latest gas appliances for cooking and hot water. The floors throughout are cement, except the tea room and central octagonal hall, which are covered with buff colour jointless flooring. The general colour scheme of the building is buff and green.

The dressing rooms for the men have been arranged on one side of the wing, with bathrooms and lavatories across the corridor in a central position. The washing arrangements have been skilfully thought out so as to provide accommodation for 80 to 100 players.

Water Heating Apparatus.

The hot water apparatus was installed by Messrs. Thomas Potterton (Heating Engineers), Ltd., of Balham, and consists of four No. 2 "Empire" gas-heated boilers, which serve two storage tanks having a combined capacity of 700 gallons. The four boiler units are arranged in twin formation, so that half the storage capacity only need be heated.

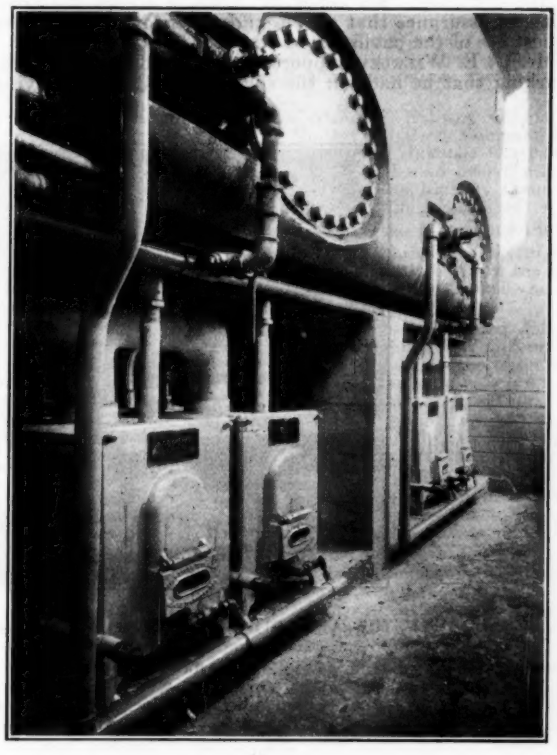
The whole of the installation is lagged, and, as a further economy, each boiler is thermostatically controlled, so that the temperature of the water can be regulated and kept constant at any desired outflow temperature. Each boiler consumes 80 c.ft. per hour when full on, and the four boilers together are capable of raising the total storage to the desired temperature, 110° F., in from 3 to 3½ hours, depending upon the initial temperature of the water.

The supply of water is at all times adequate, and the cost is so moderate that this system can be confidently recommended to other sports clubs, athletic associations, &c., who need an abundant supply of hot water on tap, at short notice, and at relatively little expense.

The architect of the new pavilion is Mr. A. Douglas Robinson, F.R.I.B.A., and the builders are Messrs. C. H. Gibson, Ltd.

The building was formally declared open by Mr. William Cash in the presence of members of the Sports Committee and the Co-Partnership Committee, and among those present were Mr. C. Hussey, J.P., Mr. G. Savory, Mr. H. Williams, and Mr. W. Cash, Junr. (Directors), Mr. W. J. Sandeman (General Manager), Mr. W. Grogono (Engineer), Mr. F. F. Wood (Secretary), Mr. W. A. Bishop (Sales Manager), Mr. M. O. Coates (Editor of the Co-Partnership Magazine), and Mr. A. Douglas Robinson (the Architect).

Mr. Cash, in the course of a few remarks, said that the Company had bought the sports ground in 1921 and had put it into use in the following year. They had spent a good deal of money on it, and it was designed for a variety of purposes which were familiar to them—cricket, football, tennis, bowls—while they also held their annual athletic sports there, when they had a big gathering of co-partners with their families and friends. They were desirous of all their employees becoming members of the Sports Club at a subscription of 3d. per week. According to the last report, 567 members paid this subscription, and there were 86 junior members; under the new arrangements the reduced



Potterton Boiler Units Supplying all the Hot Water Requirements of the New Pavilion.

subscriptions for junior members would be done away with. This gave every member the opportunity of coming to the ground and using it to the fullest extent and also of attending the sports.

INDEBTEDNESS TO THEIR WORKPEOPLE.

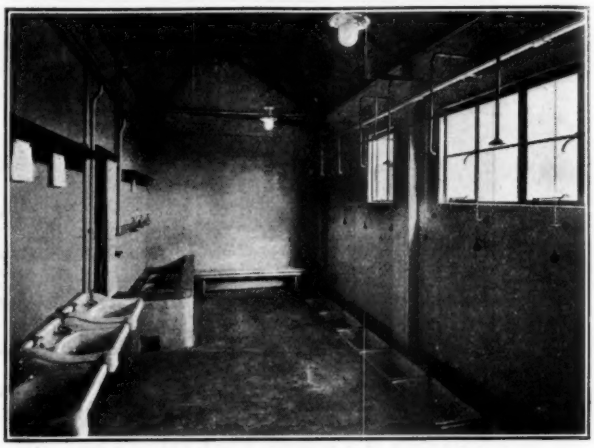
He took the opportunity of congratulating the Architect, who did a great deal of work for the Company. He also thanked the builders for the expeditious and satisfactory manner in which they had carried through the work. The total cost had been in the region of £2500, and the Directors had rather wondered whether they should spend so much money on a pavilion; but they had in mind their indebtedness to the people who worked for them, and they came to the conclusion that it would help to bring them together and keep them fit—and a fit man was a better man. The ground and the pavilion were now complete, and he hoped that their co-partners would recognize that it was their ground and had been provided for them, and would therefore endeavour to keep it in a tidy condition. Mr. Cash went on to outline a scheme which the Directors and Sports Committee had worked out for the future management of the Club. The Company would maintain the ground and pay the rates, taxes, &c., and for the gas used in the pavilion. The Hon. Secretary of the Sports Committee would be given a day each week to devote to the work of the Sports Club.

"I have now great pleasure," concluded Mr. Cash, "in declaring this pavilion open, with best wishes for its success from all the members of the Board of Directors. I hope it will bring health and happiness to the employees and help to bring together all those who work for the success of the Company and the benefit of the community."

Mr. TATAM, representing the Central Sports Committee, said how grateful they were to the Chairman and Directors for so generously providing first the sports ground and finally this artistic and perfectly equipped pavilion for the benefit of the employees. It was much appreciated. He was confident that, with the facilities now provided in this pavilion, new life would be given to the sporting activities of the Company. He asked Mr. Cash to accept the Committee's assurance that they would endeavour to make the fullest use of the pavilion.

Mr. G. E. WALKLEY supported the previous speaker, remarking that he had not the slightest diffidence in saying that they would reciprocate by giving their support to the Company over which Mr. Cash so ably presided.

Mr. CASH, in reply, said that he much appreciated the kind sentiments expressed, and believed that they did represent the feelings of them all. At the same time, he took the opportunity of acknowledging the work that the senior officers of the Company had put in in connection with the erection of this new pavilion.



Men's Lavatory Accommodation in Sports Pavilion, showing hand-basins, foot-baths, and showers, all supplied with hot water from Potterton gas boilers.

Mr. W. J. SANDEMAN assured them that it had been a "labour of love." They were very keen on this pavilion, and they would be amply rewarded for the time and energy they had expended if it was used and appreciated by the employees of the Company.

Those present were afterwards entertained at tea in the tea room of the pavilion.

THE ATTRACTIVE TEA ROOM IN THE CROYDON COMPANY'S NEW SPORTS PAVILION.

Hydrogenation of Coal.

"Of all known processes for treating coal," said Sir Frank E. Smith, in the course of the Norman Lockyer Lecture delivered before the British Science Guild on Nov. 22, "hydrogenation stands out conspicuously from the rest, inasmuch as the product is a No. 1 grade petrol. In this country the Fuel Research Board has investigated many aspects of the problem of hydrogenation, paying particular attention to the catalysts, but experiments on a very large scale have been carried out by Imperial Chemical Industries.

"To many of us progress may appear to be very slow, but when we consider that five or six years ago the cost of producing petrol from coal was estimated to be not less than 2s. 6d. per gallon, whereas to-day the estimate is 9d. per gallon, the rate of progress has, I think, been very remarkable. This 9d. per gallon is the price *ex* works, and is comparable with imported petrol at Thames mouth at about 6½d. per gallon. It will be observed that there is a difference in price of 2½d. in favour of the imported spirit, but it is well to remember that in 1920 the retail price of petrol, less tax, was 3s. 5d. per gallon and as late as 1930 it was 1s. 2½d. About 5d. should be taken from these prices if a comparison is made with the 9d. of home produced petrol *ex* works."

Hastings and St. Leonards Gas Company's Order

An inquiry into the provisions of the Special Order promoted by the Hastings and St. Leonards Gas Company (under the Gas Undertakings Acts) was held by Mr. J. F. RONCA (Director of Gas Administration) at the Board of Trade Offices, Westminster, on Nov. 21.

The Order provides for the extension of the Hastings Company's area of supply, to include the borough of Rye and a number of parishes; the application of differential prices in the added areas; power to purchase by agreement the undertaking of the Rye Gas and Coke Company, Ltd.; and the alteration of existing provisions relating to the supply and purchase of gas in bulk.

The Hastings Company was represented by Mr. J. F. Thorpe, and the only witness on behalf of the Company was Mr. C. F. Botley (Engineer and Manager). Objections were raised by the Rye Gas and Coke Company, Ltd. (represented by Mr. C. F. Baker, of Messrs. Bircham & Co., Parliamentary Agents, and Mr. Geo. Evetts, Consulting Engineer), who wanted further protective provisions with regard to the supply of consumers in streets in which their mains were laid; by the Wadhurst Gas Company (represented by Mr. A. J. Lees, of Messrs. Lees & Co., Parliamentary Agents), who objected to a proposal to transfer part of its area to the Hastings Company; and there were representations concerning the bulk supply provisions by the Southern Railway Company (represented by Mr. H. L. Smedley), the Bexhill Corporation (represented by Mr. H. Gibbon Pritchard, of Messrs. Sharpe, Pritchard, & Co., Parliamentary Agents, and Mr. Arthur Valon, of Messrs. W. A. Valon & Son, Consulting Engineers); the East Sussex County Council (represented by Mr. A. B. Winser, of Messrs. Sherwood & Co., Parliamentary Agents), and the Hastings Corporation (represented by Mr. A. J. Taylor, the Town Clerk).

PROTECTION OF THE RYE COMPANY.

The first matter dealt with at the inquiry concerned the protection of the Rye Company. The clause in the Order relating to the extension of the limits of supply contained a proviso that the Hastings Company should not, without the consent in writing of the Rye Company, supply gas to premises in any street or road in which the mains of the Rye Company were laid at the date of the Order. The Rye Company now asked that the proviso should be extended to cover streets in which their mains are laid within a period of eighteen months after the date of the Order.

Mr. BAKER (for the Rye Company) said that the Hastings Company was willing to concede a period of twelve months, but the Rye Company urged that it should be eighteen months.

Mr. THORPE (for the Hastings Company) contended that twelve months was a sufficiently long period in which the Rye Company could complete any work it had decided upon, whereas a period of eighteen months would impose an undue hardship on consumers who were anxious to use gas but could not get it from the Rye Company, especially having regard to the fact that the Hastings Company could lay the pipes and supply gas in Rye within six months of the date of the Order.

Mr. *C. F. Botley* (Engineer and General Manager to the Hastings Company, Past-President of the Institution of Gas Engineers, and a Member of the Central Executive Board of the National Gas Council) gave evidence and confirmed Mr. Thorpe's statement that the Hastings Company could supply consumers in Rye within six months of the date of the Order, but was willing to wait another six months to enable the Rye Company to make any extensions it contemplated. He indicated the positions of his existing mains, and said that the extensions contemplated by the Hastings Company in the Rye area would be held up until he knew what the Rye Company intended to do.

The matter was left in the hands of the Board of Trade, after Mr. Baker had urged that the Rye Company wanted as long a period as possible.

Mr. THORPE then went on to deal with the proposed extension of area of the Hastings Company, and intimated that there had been omissions from the notices published concerning the provisions of the Order. Mr. Thorpe asked that the notices should be amended, because it would be a pity if the proposed added area were truncated by reason of a technicality.

Mr. LEES (for the Wadhurst Company) pointed out that the Board of Trade had not the power to authorize the addition of areas with regard to which notice had not been published. The Hastings Company was already asking to compete with the Wadhurst Company in some parishes, and was now asking to take a still greater part of the Wadhurst Company's area. He regarded the proposed procedure as outrageous.

Mr. RONCA agreed that there must be a new Order if it were desired to add to the Hastings Company's limits the areas in respect of which no notice had been given.

BULK SUPPLIES.

Mr. THORPE, referring to the bulk supply clause, said that the Hastings Company had plant sufficient to produce 50% more gas than was being produced at present, and there were illimitable opportunities for extending the works should the occasion arise. In 1925 the Company had promoted an Order, which had contained a clause authorizing the giving or taking of supplies of gas in bulk. There was a proviso to the clause, however, to the effect that the Company should not supply gas under any such bulk supply contracts beyond its limits of supply if and so long as such supply would interfere with the supply of gas within the limits. A similar proviso was contained in an Order relating to the Pinner Gas Company. The difficulty was, however, that owing to the interpretation put upon the proviso, it was unlikely that other undertakings who required bulk supplies would enter into contracts with the Hastings Company. It was now asked, therefore, that the clause in the 1925 Order should be repealed and another substituted. The first part of the substituted clause was in the same terms as that in the 1925 Order, but the proviso was altered, the effect being that the Company should not supply gas under any such contract beyond its limits of supply, except to the Bexhill Corporation, the Tenterden and District Gas Company, Ltd., or the Hawkhurst Gas Company, Ltd., if and so long as such supply would interfere with the supply of gas within the Hastings Company's limits. Thus, the only distinction between this and the 1925 proviso was that three undertakings were mentioned specifically.

The Hastings Company was certain that a bulk supply to any or all of the three undertakings mentioned would not affect the supply to its own consumers.

Mr. A. B. WINSER (for the East Sussex County Council) suggested a new proviso in substitution for the proviso in the present Order. The effect of this new proviso was that the Company should not enter into contracts to supply gas in bulk beyond the limits of supply to a greater extent in the aggregate than 5% of the consumption of gas for the time being within the limits of supply, unless the Company first obtained the certificate of an independent gas engineer, nominated by the President of the Institution of Gas Engineers, that there would be no reasonable prospect of interference with the supply of gas within the limits of supply by reason of the bulk supply contracts.

Mr. *Botley* said that the principle of the proviso would meet his views, though he considered that the figure of 5% was too low. He would have no difficulty in obtaining the necessary certificate.

Mr. H. L. SMEDLEY (for the Southern Railway Company), cross-examining, said that the Southern Railway Company had six or seven railway stations within the Hastings Company's area of supply; in the last year they had used over 6 million c.ft. of gas, and it was important that the Railway Company should be able to rely upon the supply being maintained.

Mr. *Botley* replied that there need be no fear about that.

Mr. H. GIBBON PRITCHARD (for the Bexhill Corporation) said that if the Hastings Company was prepared to insert the proviso suggested by Mr. Winser, for the County Council, he did not need to cross-examine.

Mr. RONCA pointed out that the proviso suggested did not impose any time limit. He would have thought it difficult for an independent engineer to give a certificate to the effect that a bulk supply contract would not affect the supply to the inner area, if such contract was without a time limit. There was a possibility that the Board of Trade would not insert the suggested proviso, though, of course, he could not commit himself. Therefore, it might be well for Mr. Pritchard to cross-examine.

Mr. PRITCHARD asked why, if the Hastings Company would refuse to enter into a bulk supply contract which might prejudice the supply in Hastings, there was any objection to the existing proviso in the 1925 Order.

Mr. *Botley* said the reason was the suggestion that under that proviso the Hastings Company would have to withdraw the bulk supply if there were a greatly increased demand for gas in Hastings. It would be impossible for anyone to contract to take a bulk supply under those conditions.

Replying to Mr. Thorpe, he said that if the demand increased one would naturally provide extra plant, so that it did not really matter about a time limit.

Mr. THORPE, referring to the consumption of 6 million c.ft. by the Railway Company last year, said that it represented only 1% of the Company's output, and the Railway Company could be assured of its supply.

Mr. *Valon* (for the Bexhill Corporation), commenting upon the reference made to the necessity for maintaining manufacturing plant at Bexhill even if a bulk supply were arranged, said the main reason for maintaining it was that otherwise the Corporation would not be in a good position to make a further bargain at the end of the contract.

Mr. TAYLOR (Town Clerk, Hastings) said that the Corporation did not wish to embarrass or interfere with the progress of the Hastings Gas Company, but regarded the proviso in the present Order as being very unusual, and considered that for all practical purposes the 1925 clause, which it was sought to repeal, provided all that was necessary.

Mr. A. B. WINSER said that the 5% mentioned in the sug-

gested proviso was purely an arbitrary figure, and the intention was that where it was desired to enter into a bulk supply contract covering quantities which in the aggregate were small, the Company should be able to do that without obtaining a certificate from an independent engineer. Where substantial quantities were to be contracted for, however, a certificate would be necessary.

Mr. THORPE said that, on the one hand, the Company would not undertake a burden it was unlikely to be able to fulfil; on the other hand, it was said that after a contract had been arranged some unforeseen circumstance, such as a strike, might affect the Company's capacity. He did not think the ingenuity of even a gas engineer was such that he could guard against contingencies which might arise after a contract had been entered into. The existing clause was a real handicap, and he urged that this was a case in regard to which the Board of Trade might depart from the general rule. Things had changed, even in the Gas Industry, since 1925.

EXTENSION OF AREA.

Mr. Thorpe, dealing with this part of the case, said that the Hastings Company had a capital expenditure of £348,000, and in 1931 had made a profit of roughly £28,000. The extent of the area of supply was 70 square miles, and it was proposed to increase it to 88 square miles. It had the capacity to manufacture 50% more gas than it supplied, and had every anticipation of raising further capital when required. As showing that the Company could be entrusted to develop new areas, he recalled that in 1925 the area was extended to include that of the Battle Company, which was a non-statutory undertaking. Since then the price of gas had been reduced in that area, 20¾ miles of mains had been laid, and the number of consumers had increased from 249 to 572.

In the areas now proposed to be added there had been applications for gas supplies by potential customers, and the Company's mains were within two or three miles of the areas proposed to be added. He was afraid, however, that in making these proposals the Hastings Company had trodden on the toes of the Wadhurst and District Gas Company, because part of the area proposed to be added to the Hastings Company's area of supply was already within the area of supply of the Wadhurst Company. The only way to reach economically some of the parishes to be supplied was through part of the area of the Wadhurst Company, though that part had not a supply of gas. However, the Wadhurst Company regarded it as an invasion. If the Wadhurst Company could satisfy the Board of Trade that it was in a position to supply gas there in the near future, the Hastings Company would not contend for a moment that it should invade the district, but, if one compared the potentialities of the two companies, it was likely that the Hastings Company would supply before the Wadhurst Company would. It was proposed by the Hastings Company to lay a main through Winchelsea to Rye, and then more or less in the form of a circle to supply other places. It was proposed to apply a differential price of 4d. per therm in the Borough of Rye, and 6d. per therm in the new area outside Rye.

The difficulty about the parishes which the Hastings Company proposed to include in its area, but which were already within the area of the Wadhurst Company, was that if the Hastings Company did not supply there it might not be economical to reach other parishes which it was desired to include. It might be desirable to provide that if the Wadhurst Company did not supply the particular parishes within its area in a certain time, its power should cease, and the Hastings Company should be entitled to supply there.

Mr. *Botley*, giving evidence, said that the Company had a very large margin of borrowing powers, and he would expect that the Company could raise money at 4%. He gave details of the work it was proposed to carry out in the added area.

Mr. LEES, cross-examining, said it was proposed to take the Parish of Salehurst from the Wadhurst Company, and also an area covering 100 yards on either side of a main road at Hurst Green in the Parish of Etchingham, which was also within the Wadhurst Company's area. He asked if Mr. Botley had ever heard of a gas company before asking for an area comprising 100 yards on each side of a main road.

Mr. *Botley* said he had not, but he could conceive that it would be very useful.

Mr. LEES said it was not fair to take the fat and leave the lean, and he asked who was going to supply the consumers whose premises were not within 100 yards of the main road.

Mr. *Botley* replied that it was not in his contemplation to supply only the most convenient consumers. He had scheduled this particular area in order to take the main through.

Mr. LEES (addressing Mr. Ronca) said that one could not help being impressed by the manner in which the Hastings Company's application had been put forward. It was proposed to go through two old boroughs, with small populations, and then through marsh land to a number of parishes. Two of the parishes concerned were within the area of another Company, and then, at the inquiry, it was said that certain other parishes, which ought to have been included, had been left out, as the result of oversight. One could only conclude that the application could not have been given very much consideration. It would be most unreasonable to allow competition with an existing statutory Company in the Parish of Salehurst and along the main road at Hurst Green. Even if powers were given to the Hastings Company to supply there, the Board of Trade could not, by this Order, prohibit the Wadhurst Company from carrying on. Under Section 7 of the Gas Undertakings Act, 1929, the power of the Board of Trade to make Special Orders under Section 10 of the Gas Regulation Act, 1920, was extended. He held that the Board could prohibit an existing undertaking from exercising its powers in an area only on the application of an undertaker that that should be done, and there was no such application. Again, reference was made in Section 7 of the 1929 Act, to authorizing applicants to supply gas in any area within the limits of supply of existing undertakers who had *failed* to provide mains for the supply of gas in the area. Mr. Lees quoted from Mr. Askew's book on the Gas Undertakings Acts, where it was submitted that there could hardly be said to be a failure to provide mains in those cases where there was no demand for gas in the area concerned, or where the demand had only arisen recently, and the undertakers had not had reasonable time in which to provide the mains. He adopted that as his argument in this case.

The Wadhurst Company, he continued, had obtained its powers to supply in the area on Aug. 7, 1914—a few days after the declaration of war. It could not have done anything during the war; after the war, costs had risen, and it was very difficult for small companies to raise capital. About eighteen months ago, however, the control of the Wadhurst Company was obtained by the General Gas and Electricity Company, Ltd., and it was proposed to develop the area. Before it had known anything of the Hastings Company's application the Company had given consideration to the development of the area; it had to be developed as a whole, and if the Hastings Company were allowed to compete in the area it would kill the Wadhurst Company. It had not been the policy of Parliament or the Board of Trade to allow competition for many years. The Board of Trade had also to give consideration to other parishes in the Wadhurst Company's area, which parishes the Hastings Company did not ask to include in its area.

Col. *J. Reid Hyde*, C.B.E. (Managing Director of the Wadhurst and District Gas Company, and Chairman of the General Gas and Electricity Company, Ltd.), gave evidence. The authorized capital of the General Gas and Electricity Company, Ltd., he said, was £200,000, and the paid-up share capital was £104,977. There were no debentures, and the Company was in a very favourable position to raise capital. It was the object of the General Gas and Electricity Company to provide small companies with capital, because it could raise it more cheaply, as a big undertaking, and it had decided to acquire shares in the Wadhurst Company with the full intention of developing it and making it a paying proposition. As far back as May, 1931, the development of the area was under consideration, and the estimates of the possible earnings of the Company were based on the extension of the mains to supply districts such as Robertsbridge, Salehurst, and others.

In reply to Mr. Ronca, he said the Company contemplated developing that area almost forthwith.

Cross-examined by Mr. Thorpe, Col. Reid Hyde said that the Company was not thinking of putting down new manufacturing plant necessarily, but of purchasing bulk supplies.

He did not think the Wadhurst Company could have developed the area before the General Gas and Electricity Company had acquired the shares, because it could not have raised the money.

Mr. THORPE asked if the Company would be prepared to be put under an obligation to supply within twelve months.

Col. *Reid Hyde* said that the Company was going to create a demand, and he did not like the idea of an obligation to do it in a given time. The Company must have a reasonable time.

Mr. THORPE asked if he would accept an obligation to supply within eighteen months.

Col. *Reid Hyde*, in return, asked whether, if the Wadhurst Company failed to do it, the Hastings Company would take over the whole area, and not certain parishes, as was proposed in the present Order.

Mr. THORPE, in his final address to Mr. Ronca, said he had been under the impression that the Wadhurst Company was more or less impecunious, and that if the Hastings Company did not get the powers to supply in the area in question, there would be no supply at all. If, however, it was the intention of the Wadhurst Company to supply, and it had the money, no doubt it would supply. But it put the Hastings Company in difficulties, because it would be prevented from constructing the proposed ring main.

After an examination of the map, Mr. Thorpe agreed that it would be possible to construct a ring main without going to the areas within the Wadhurst Company's district; it would be a restricted ring, but it would be workable.

There was some further discussion between the parties, after which Mr. Thorpe said the Hastings Company considered it proper to withdraw the application for powers to supply in the parishes which were within the area of the Wadhurst Company. The Hastings Company had heard with satisfaction that something was to be done in the near future.

Mr. RONCA said he was very glad to hear that, because it was a difficult matter to decide between the claims of two gas undertakers. He could not help feeling that in this case statesmanlike action had been taken, and that the Hastings Company had done the right thing in the circumstances.

Mr. THORPE remarked that perhaps the Wadhurst Company would buy gas in bulk from Hastings.

Col. *Reid Hyde* replied that that was what he hoped to do.

The inquiry then closed.

THE "JOURNAL" TECHNICAL RECORD

Which contains Reports of Meetings of Gas and Allied Associations

Rental Office System in a 300 Million Works Employing Accounting Machinery*

By F. G. SALE, Secretary, Ramsgate Corporation Gas and Water Department.

At the request of your President, I submit this paper for your consideration in the hope that the information it contains will in some measure at least be useful to those who may be contemplating a change in their office methods, or to those who, after reading these notes, think such a change is not only desirable, but possible.

I suggest that the extent to which we have adopted mechanization in Ramsgate may be the extent to which some of the smaller undertakings may be willing to go, for the advantages, as we see them, are well worth the initial expense and the work involved in the change-over.

The Gas Department at Ramsgate is combined with the Water Department, and one staff operates the work of the two Departments. The rental office work is closely intertwined, and it is impossible to describe the methods of the Gas Department without at the same time often making reference to the Water Department. When, therefore, "water" is mentioned, it is because it is absolutely essential to do so in order to describe our methods with the detail necessary.

The offices of the Department are situated at the Gas-Works, so that all activities are concentrated in one spot. This is, of course, a great advantage to the Corporation, the consumers, the officials, and the staff generally, as it not only ensures that close contact between consumers and Department, which is so vitally necessary to-day, in pressing home the advantage of gas, but it ensures that greater sense of satisfaction to consumers which results from immediate replies to all questions raised.

Before describing our present rental system and methods, a brief outline must be given of the old system and the reasons leading to the change.

OLD SYSTEM.

Up to 1927 the accounts were made up entirely by hand with the exception that from 1924 the names and addresses were inserted by means of an Elliott hand addressing machine. The gas rental ledgers consisted of bound books with columns ruled for debits and credits in the usual manner, and so arranged as to show four quarters' transactions at an opening. Each book lasted one year and the names and addresses of all our consumers had to be written by hand in each new book.

The particulars of meters and meter readings were contained in some 20 separate books, and these were used by the meter readers. Particulars of apparatus on hire and on hire-purchase, with appropriate charges, were respectively contained in separate ledgers.

The method of preparation of the quarterly accounts for gas and water may be briefly summarized as follows: The name and address of each water consumer and the amount of water rate was copied from the water rental on to the account form. The last index of the gas meter (where the water consumer was also a gas consumer) was added and new accounts written out for gas consumers only. The names and addresses were then inserted in the collector's collecting book with the amount of water rate.

The gas index readers commenced some ten days before the close of the quarter. On the return of the books to the office, the indices were transferred to the accounts and the consumption priced out, while the queries were so marked. The accounts were then entered up in the rental ledger and rentals and hire-purchase items were added to the accounts. Queries were thrown out to be attended to later.

By this time the end of the quarter was passed allowing all arrears and fittings items due (up to one month before) to be extracted and inserted on the accounts, and the collector's collecting books completed by inserting the totals of the gas items. The accounts were then added up separately as gas and water items, and in one combined total at the bottom. They were delivered to consumers by hand in envelopes on which the full name and address had been written or stencilled since 1924.

The delivery covered a period of five or six weeks, finishing about the end of the second or third week of the second month.

Discount is granted to our consumers as follows:

1. On any quantity up to 125 therms per quarter, 5%.
2. On any quantity from 125 to 312 therms per quarter, 7½%.
3. On any quantity from 312 to 1250 therms per quarter, 10%.
4. On any quantity over 1250 therms per quarter, 12½%.

(On condition that accounts are paid within one month of being rendered.)

In practice, owing to the rather late delivery of accounts, the date fixed for expiry of discount period stamped on the accounts often had to be postponed, as the consumers claimed their right to be granted discounts up to one month from the date of delivery of accounts. As soon as possible after delivery of the accounts, the gas rental debits were summarized, being completed at approximately the end of the second month, and the rentals were then finally balanced as regards cash, discount, arrears, &c. It will be seen that the foregoing operations covered a period from first to last of over two months. The posting of cash into ledgers proceeded as rapidly as possible, but was never really up-to-date until a final rush at the end of the quarter ensured every item being posted so that the extraction of arrears could take place as previously stated.

The position at the end of 1926 was that owing to the number of new houses built and the increase in the number of gas and water consumers since 1922, it gradually but surely became impossible under the existing system, to cope with the large amount of extra work involved. It was apparent that the general work of the rental department was gradually getting more and more behindhand. and in order that the accounts should be rendered and the books balanced once a quarter a tremendous amount of overtime was worked by the staff.

It must be borne in mind in this connection that the chief rental clerk, who was responsible for keeping the gas and water rental ledgers, and who had occupied this position for some forty years, was away ill for the greater part of 1926, and retired on superannuation in 1927; also that the Secretary and Assistant Secretary, who had been with the Department since its inception in 1877, were due for early retirement. Every indication was that the time had arrived when the entire system needed overhauling.

As an ideal, we had in mind that an efficient rental system should, among other things, comprise the following essentials:

1. That the writing by hand should be reduced to a minimum.
2. That the quarterly accounts should be completed and despatched during the first fortnight of the quarter.
3. That the rental ledger should contain exactly the same detail as the account contained, and obviously this could only be done by making the rental ledger sheet a carbon copy of the account.
4. That unexpected expansion, owing to an influx of new consumers caused by extensive building operations, &c., could, within certain reasonable limits, be provided for.
5. That provision could easily be made for the names of consumers to be altered in cases of changes of tenancy, &c.

In October, 1926, Mr. Ruthven and the Chairman visited Newcastle for the conference of the British Commercial

* Paper read before the Southern Association of Gas Engineers and Managers, Nov. 16.

Gas Association and were very much impressed by the gas rental system in operation there, which appeared to combine the advantages we were looking for, and after going into the matter thoroughly it was decided by the Gas and Water Committee to adopt a system based on the same principles, and I was entrusted with the work of installation.

In 1927, by the courtesy of the Secretary and Commercial Manager (Mr. T. P. Ridley) and the Rental Superintendent (Mr. John Heywood), I was enabled to spend some days at the offices of the Newcastle and Gateshead Gas Company, studying their system and inspecting the whole routine work of their rental office, and I gladly pay my tribute of grateful thanks to Mr. Heywood for his wonderful assistance and advice at all times.

Office Machines.

The methods described in this paper, therefore, owe their origin to a very large extent to the foundation laid so ably by Mr. Heywood in Newcastle, but, of course, obviously altered and extended to suit our special circumstances at Ramsgate. The appliances installed at Ramsgate were:

One Burrough's public utility machine.
One Elliott addressing machine.
One Burrough's portable adding machine.
One typewriter (removed from another office).

The Burrough's public utility machine is specially designed for our work, and in addition to printing the accounts, prints, by means of carbon paper, an exact copy of the account on the ledger sheet.

Fixed to the carriage at the back of the machine, immediately behind the printing type, is a pocket the exact size of the account, which is dropped into it, and in which the account is in line with the type. The carriage behind the pocket moves vertically or horizontally by the operation of motor touch bar so that the figures may be printed side by side or under each other as required.

The carriage has an india-rubber roll or platen round which the ledger sheet, covered by carbon paper, is wound. The ledger sheet is ruled to take ten accounts and the spaces exactly coincide with the spaces on the gas account, so that, as stated, an exact copy of the account is obtained. When ten accounts have been typed the total key is pressed, and totals for six columns are obtained. This is the capacity of the listing machine. The columns added by the machine are: Previous and present meter states, cubic feet consumed, therms, price of gas and total charges.

The Elliott addressing machine is a standard machine taking wax stencils 4½ in. by 2 in. on which the names and addresses are cut by means of an ordinary typewriter. The machine is fitted with a special selector device. The Burrough's portable adding machine is a standard machine adding up to £999,999 19s. 11¾d.

In installing the new system, it was decided to make the change over between June 30 and Sept. 30—in other words, that the accounts and rental should be made up on the old system for the June quarter, and on the new system for the September quarter—and everything should be transferred complete from one system to the other between these dates.

Installing the New System.

The ideal aimed at in commencing the new system was to lay the foundation in so sure a manner that the structure could be built up efficiently to give permanently good results. We therefore took nothing for granted, but examined every step with minute care.

First, the names and addresses of all ordinary gas consumers, secondly, the prepayment and slot gas consumers, and, thirdly, the water consumers were extracted separately, carefully checked as to the accuracy of names and addresses, position of houses, position of streets in relation to district, and, when corrected, finally interwoven into one stream. From the list thus obtained the "Addressograph" stencils were typed, and each marked in the manner described later. From these stencils were printed the names and addresses of ordinary gas consumers and prepayment and slot consumers on to the appropriate meter cards, followed by the transferring of particulars of meters and all apparatus and charges in connection therewith, extracted from the respective ledgers.

From the same stencils were printed the permanent name sheets for the gas rental ledgers in two runs—viz., ordinary and prepayment and slot. This (as will be detailed later) established the folio reference for each consumer. These folios were then added to the meter cards. The amount of water rate was also inserted. It was arranged that the ordinary and prepayment accounts were of different colours, so that they could be easily recognized, and the names and addresses were next printed on these.

One of our staff was selected to operate the Burrough's machine, and this being fixed on a Sunday morning, Sunday afternoon was spent in tuition, and at 9 a.m. on Monday the insertion of water rates on the accounts was commenced.

The inspectors and index readers were instructed how to deal with the new cards, and the rental clerks and staff were instructed in their duties, and gradually the gas accounts got under way. The date fixed for the last account of the first half to be ready to be placed in the post was Oct. 6, and the last of the second half, Oct. 13. In order to give the consumers the requisite month in which to receive discount, the expiry dates for discount were printed on the accounts as Nov. 7 and Nov. 14 respectively.

In installing the new system, all the work in connection with the preparation of accounts under the old system was left severely alone, while all work connected with the fixing and changing of meters and apparatus and charges incidental thereto, had to be carried on and kept up-to-date on the old system, so that it could be transferred to the new when ready and then kept up-to-date again. This method entailed a certain amount of risk, but by sheer hard work on the part of all concerned, coupled with my own optimism, the work was accomplished, and the accounts were posted to consumers by the dates specified. I would like to emphasize that during the whole of this work no outside help in any form was used.

During the remaining quarters of 1927 and 1928, each particular operation of the rental office staff was inspected and overhauled, and when necessary improved and brought up-to-date, especially from the point of view of making it one of the cogs in the whole routine, also with the object of checking or safeguarding some particular item during the course of operations.

After we had got the system into working order and running smoothly, it was decided to re-organize the whole of the rental office staff in order that it should give the best results. Several duties were not clearly defined, and there was a certain amount of overlapping on the one hand, with the utter impossibility of definitely fixing the responsibility for certain duties on the other. The following staff was therefore created out of the old and their duties definitely defined.

Rental Superintendent,
Gas Rental Clerk with junior assistant,
Water Rental Clerk with junior assistant,
Apparatus Clerk,
Residual and Wages Clerk,
Burrough's machine operator,
Stencil Clerk,
Typist,
Junior Clerk,

in addition to the existing collector and cashier, who were not affected by the change. The present arrangement has worked exceedingly well and the whole of the routine work of the offices runs smoothly.

Present Rental System.

Our rental system commences with obtaining the consumer's signature on the appropriate agreement cards when application is first made for a supply. The agreement cards are handed first to the apparatus clerk, whose immediate duty is to make the necessary alterations or additions to the gas rental ledgers and meter cards (which will be described later); and in the case of entirely new consumers, the agreement card is held by the apparatus clerk as a check against the issue of a gas meter card by the stencil clerk. When finished as regards gas, the cards are handed to the Water Rental Clerk as affording supplemental information for water purposes if necessary. When finished with by the Rental Department, these agreement cards are filed away in alphabetical street order, so that they are easily available for use or reference.

The first duty of the clerk, showroom attendant, or inspector dealing with the case, after getting the agreement form signed, is to convey particulars of the full name and address together with all other information necessary to the clerk in charge of the stencils and "Addressograph" machine, by placing ticks against the appropriate items on a stencil information form.

The stencil clerk then proceeds to correct an existing stencil or to cut a new one, and to "mark" it as described later. The name and address is then printed on the appropriate meter card. This is handed to the apparatus clerk as a notification that a meter and possibly other apparatus will soon be fixed. This meter card thus links up with the agreement card, previously handed to the apparatus clerk for checking purposes. In this way the original preparation of the stencil is designed as an excellent safeguard to make absolutely sure that despite other precautions, no meter or other apparatus is fixed without it being properly recorded.

For use with the selector device, the stencil for the addressing machine can be marked in such a manner that it will be printed when required, to the exclusion of other stencils not marked or marked differently. In our case

we mark stencils as to whether the consumer is a gas and/or water consumer; if gas, whether the supply is through an ordinary or prepayment or slot meter; if ordinary, whether the accounts are required in the ordinary way quarterly or specially weekly or monthly; and if prepayment or slot, whether accounts are required for hire-purchase charges, &c. In the case of water, whether accounts are required quarterly, half-yearly, or yearly.

It may be as well to point out that if a consumer requires an ordinary gas account quarterly, but only requires a yearly water account the stencil must, of course, conform to the four quarterly accounts and not to the one yearly account. The stencils are arranged in a fixed geographical street order and filed in trays, each holding up to 200 stencils—*i.e.*, the stencils for, say, Nos. 1, 3, 5, 7, 9, Blank Street, are placed in consecutive order, although the consumer at No. 1 may be an ordinary consumer, the consumer at No. 3 slot, the consumer at No. 5 prepayment, and the consumer at No. 7 water only, while at No. 9 the water rate may be paid by someone residing elsewhere. The trays are fitted into wooden cabinets holding 20 trays, each tray being labelled with the first and last address. The number of stencils put into a tray depends entirely on whether the district is fairly built on or otherwise. In the case of necessity, however, it is an easy matter at any time to re-adjust the stencils or to spread them over a further number of trays.

Meter Cards and Rentals.

Under this system, meter readings are recorded on meter cards, a separate card being used for each meter. Each card bears the consumer's name and address, particulars of meter and apparatus on hire or hire-purchase, and space is available for recording any privately-owned gas consuming apparatus on the premises. It also contains spaces for the cubic feet of gas consumed, number of therms, and columns ruled for price of gas, rentals of apparatus, and the total charges. It thus becomes a ledger card from which the accounts and ledger sheets are prepared. The meter cards are filed in drawer cabinets in two sections—ordinary and prepayment—in the same fixed street order as the stencils.

The gas rentals consist of loose-leaf books containing, on separate narrow sheets, the names and addresses of consumers in the ten spaces provided; these sheets are numbered consecutively, while the spaces on each sheet are numbered from 1 to 10. They remain in the binder permanently. The ledger sheets are numbered to agree with the name page, against which it is inserted in the binder. The number of the book, the number of the page, and the number of the space give the folio reference for that particular consumer, which always remains the same. Thus reference 1/92/9 means that the account is in book one on folio 92, and on the 9th space on that folio. The ledger sheet remains in the binder until after the quarter's rental is balanced and is replaced by the new sheet, when it is ready, usually during the third week of the quarter. The ledger sheets are then bound permanently.

As the ledger sheet is printed simultaneously with the account, and the whole operation has been described, it is unnecessary to repeat it here. In the gas rentals all the ordinary consumers are kept together, and all the prepayment and slot. By this means it is easier to summarize the totals in their respective sections, than if they were all mixed up together.

Preparation of Accounts.

The names and addresses are first printed on the ordinary, and then on the prepayment accounts by means of the Elliott addressing machine. By means of the selector device, it is an easy matter to carry out the above operation. The number of accounts printed each quarter is nearly 9000, and the operation is spread over four days, as the operator performs many other duties. If necessary, they could be printed in two normal days.

The accounts are first passed to the clerk, who inserts on them by hand the particulars of water meter charges and the particulars of complicated water accounts where several items are involved. The operator of the Burrough's machine then prints on them all the remaining " single " water rates, the total being agreed with the water rental ledger. At the end of this operation (which is before the gas index readers start) the accounts are finished so far as current water items are concerned.

The gas meter index readers commence reading meters on the 12th of the month in which the quarter day occurs (or nearest suitable day, if the 12th is a Saturday or a Sunday). Three readers are employed, and the inspector hands out to each man at night approximately 140 cards, which is rather more than he is expected to finish the next day. Those read are brought in at the close of the day, and those unread are retained. The latter, with a further new batch, form the next day's work, and so on. The rule with regard to unread meters, is that the meter reader calls at the house twice after the original call, unless he knows for certain that the consumer is away from the town or the house shut up. If still unable to read the meter, a card with a diagram of a three-dial or four-dial meter, as the case may be, is dropped into the letter box, asking the consumer to let us know when the meter can be read, or otherwise to mark on the diagram the meter readings themselves. On an average about 80 of these cards are returned each quarter.

The cards containing indices of read meters are handed to the rental clerk the first thing next morning after reading. These are scrutinized carefully, and those which appear correct are priced out; charges for hire of apparatus are inserted, together with hire-purchase items, &c. The total charges are then added up, and those accounts which appear heavy, light, &c., are queried. Our rule is that these queries must be dealt with the next day at the latest, so that by the end of the third day, all the indices read on the first day are dealt with and most of them settled. This sequence is followed right through. The number of ordinary accounts is 3500, and with three index readers visiting approximately 120 new addresses each day, the whole operation takes a fortnight. As far as possible, we try to read the index of each meter on the same day of the month each quarter. This plan has many advantages, the chief, of course, being that the consumption charged covers the same number of days in each particular quarter, making checking from the consumer's point of view easy, and avoiding queries being raised by them as would be the case where dates differ materially.

When the cards are finished by the rental clerk, the operator of the Burrough's machine then prints the account, and, as already stated, by means of carbon paper, produces the ledger sheet. The ledger sheet is self-balancing; by adding the consumption to the previous reading, the correctness of the figures of the present reading is confirmed, and by adding together the figures for price of gas and the totals of various rentals, the correctness of the total charge is confirmed. The totals for rentals (meters, cookers, fires, &c.), usually small sums, are added on the portable adding machine by the operator.

The accounts are now completed as far as current gas and water is concerned. The amount of discount is then inserted by the rental clerk. After the close of the quarter, all amounts owing for gas and water fittings, up to the last day of the quarter, together with any arrears, credits, &c., are inserted. The items are then added up separately for gas and water totals, but added into one grand total to show the total amount owing. The accounts are then ready to despatch.

We now use mica window envelopes, which obviously dispenses with the work of addressing each envelope separately, and ensures much greater speed in despatching. The accounts for prepayment gas consumers, including, of course, water, are handed to the prepayment collectors for delivery, but in all other cases the accounts are sent by post.

I might explain that for convenience our district is divided into two parts, called the " first half " and " second half " respectively. The quarterly accounts commence to go out on the second day of the quarter, and the " first half " is completed by the 6th and the " second half " is completed by the 13th day of the quarter. The total debits on the ledger sheets are then summarized, also as far as possible on the Burrough's machine, and from the totals of this summary is obtained the amount of gas consumed throughout the area for the quarter, with the amounts charged for gas and rentals of apparatus, and the total amount to be collected.

The ledger sheet provides not only for debits, but for credits too, so that the complete account is seen at a glance. The credit rulings for discount, allowances, cash paid, and arrears for the quarter, and also for the succeeding quarter's credits (exchange tenants, &c.), correspond in line with each debit. The posting of cash items into the rental ledgers is done by hand by means of a carbon duplicate posting strip, so that the correctness of the amount posted is checked at the conclusion of a certain pre-determined number of items. After the two discount dates have expired, a list of amounts still unpaid is supplied to the collector.

Advantages.

In practice we find the advantages of our rental system to be as follows: The quarterly accounts commence to go out on the second day of the quarter and are all in the consumers' hands by the fourteenth. The rate of delivery is regulated so that as far as possible each consumer receives his account on the same date each quarter. All payments in respect of amounts outstanding are credited on the accounts right up to the moment of despatch thus removing a frequent cause of friction with consumers—viz.,

that the account is sent out containing an item for which payment has been made.

The accuracy of accounts as regards subtraction of last index from the present index, the amount of charge for gas, the hires and hire-purchase items, and the addition, is proved automatically by the Burrough's machine. The accuracy of the accounts is thus assured and disputed accounts from this cause are unknown.

Cash commences to flow in on the fourth day of the quarter, and 80% of the amount due for gas is paid by the end of the second week of the second month, as compared with a much slower rate of payment under the old system, as will be seen by the actual figures given below for the quarter ended June 30, 1932, in comparison with the corresponding quarter for 1927. This quarter's results are typical of every quarter.

Comparison of Cash Collected During the Quarter Ended June 30, 1927 (Old System), and June 30, 1932 (New System).

	£ s. d.	£ s. d.
Amount outstanding at March 31, 1927.		950 8 8
Quarter's rental due March 31, 1927	19,451 15 2	
Deduct supplemental payments, credits, &c.	7,248 12 0	
	12,203 3 2	
Amount remaining to be collected April 1, 1927		£13,153 11 10

	£ s. d.	£ s. d.
Amount outstanding at March 31, 1932		638 6 6
Quarter's rental due March 31, 1932	20,063 15 1	
Deduct supplemental payments, credits, &c.	8,870 8 6	
	11,193 6 7	
Amount remaining to be collected April 1, 1932		£11,831 13 1

—	Cash Paid to Date.	Discount to Date.	Total to Date	Percentage to Date.
1927.	£ s. d.	£ s. d.	£ s. d.	
April 7	125 13 11	1 14 7	127 8 6	0·97
,, 14	409 18 4	6 10 6	416 8 10	3·17
,, 21	856 17 6	28 9 11	885 7 5	6·73
,, 28	1,560 4 3	62 11 8	1,622 15 11	12·34
May 7	2,562 17 3	99 9 9	2,662 7 0	20·24
,, 14	3,703 13 6	161 14 6	3,865 8 0	29·39
,, 21	5,643 8 8	270 0 6	5,913 9 2	44·96
,, 31	8,511 14 9	413 2 11	8,924 17 8	67·85
June 7	8,075 4 3	422 3 9	9,097 8 0	69·16
,, 14	10,810 15 6	570 11 9	11,381 7 3	86·53
,, 21	11,089 17 10	578 14 11	11,668 12 9	88·71
,, 30	11,409 0 7	583 11 8	11,992 12 3	91·17
Amount outstanding at June 30, 1927			1,160 19 7	8·83
Total			£13,153 11 10	100·00

—	Cash Paid to Date.	Discount to Date.	Total to Date.	Percentage to Date.
1932.	£ s. d.	£ s. d.	£ s. d.	
April 7	358 16 9	20 9 10	379 6 7	3·21
,, 14	1,138 14 7	67 11 2	1,206 5 9	10·19
,, 21	1,926 12 7	117 0 9	2,043 13 4	17·27
,, 28	3,001 10 8	202 18 3	3,204 8 11	27·08
May 7	4,934 15 1	329 7 4	5,264 2 5	44·49
,, 14	8,994 14 8	641 3 11	9,635 17 7	81·44
,, 21	9,500 2 3	668 1 0	10,168 3 3	85·94
,, 31	9,676 6 2	669 8 7	10,345 14 9	87·44
June 7	9,809 16 8	669 8 7	10,479 5 3	88·57
,, 14	9,984 1 7	670 4 1	10,654 5 8	90·05
,, 21	10,103 1 9	670 6 0	10,773 7 9	91·06
,, 30	10,329 1 7	670 0 0	10,999 7 7	92·97
Amount outstanding at June 30, 1932			832 5 6	7·03
Total			£11,831 13 1	100·00

Discount ceases at the fixed dates—viz., the 7th and the 14th of the second month of the quarter—except in special exceptional cases. The collector definitely does not call on consumers for current amounts until the expiration of the above dates, leaving time for other duties. Writing in connection with accounts and summarizing of rental is reduced to a minimum. The rental summary is balanced by the 9th day of each quarter, and the new summary is completed not later than the 21st day of the quarter, and frequently by the 16th or 17th.

The rental ledger is in the hands of the rental clerk not later than the same dates which enables the posting of cash therein to be commenced early and speedily brought up-to-date, and then kept up-to-date daily, so that for at least the second two months in each quarter the cash paid one day is posted into the ledgers the following day; any query arising is therefore disposed of at once.

The meter card contains particulars of all the essential items of debits, and it is not necessary to refer to several separate ledgers for these particulars. Each consumer's account has a definite fixed reference number which facilitates easy reference. The rental ledger sheet, being a carbon copy of the account, removes any possibility of danger from items on account differing from those recorded in the ledger. To ensure that the whole of the work in connection with the preparation and despatch of accounts from first to last is proceeding in a regular and systematic manner, and to ensure that each cog in the wheel is working satisfactorily, a detailed time table is issued at the beginning of the quarter, setting out the various operations, the date they are to be commenced and finished, and the name of the clerk who is responsible. These dates are adhered to very rigidly and ensure the work being done to time. Moreover, the time table is very much appreciated by the members of the staff, who know exactly when they are expected to do a certain job.

It must be borne in mind that from the commencement of reading the index of meters, to the completion of accounts for despatch, the rate of flow for each operation is the same—viz., the index readers read approximately 300 meters per day, the same number of accounts is priced out next day, and this rate of flow is maintained throughout the work.

It should be noted that the job voucher system, introduced by the British Commercial Gas Association and amended by us to suit our own particular requirements, is used by the Department in connection with all its fitting work and installation of apparatus, &c.

In this connection, it may be of interest to state that we have in use vouchers of three different colours—viz.:

1. White, for unchargeable work of every description, other than when apparatus is used.
2. Pink, for work involving the use of apparatus.
3. Blue, for ordinary fitting work chargeable to the consumer.

The pink voucher, in addition to its ordinary use, is utilized by the Rental Department to check the fact that the apparatus mentioned on it, whether meter, apparatus on hire, apparatus on hire-purchase, or apparatus sold for cash, is correctly recorded and charged. Another check on the fixing of apparatus is provided by the fitter who fixes same, returning a written form as an additional safeguard to make sure that the apparatus has been duly recorded.

In addition to these methods of ensuring accuracy, we have a simple system of dealing with new apparatus received, under which it is given a definite letter and number to indicate at which depot it was received, and the subsequent destination of each piece of apparatus going out is noted against the original entry. By this means it is an easy matter to ascertain what apparatus is in stock and to check same at any given date. New meters on receipt are treated similarly, and their entry on the ordinary meter cards and into slot and prepayment books is proved by a direct check, while fixing of a meter as an exchange is checked directly with the pink voucher previously mentioned.

In a small office such as Ramsgate, one clerk has frequently to perform many duties. For instance, the work of the gas rental clerk includes checking of the whole of the receipts issued by prepayment and slot collectors; also all work in connection with hire-purchase sales. In the case of the Burrough's machine operator, he is also responsible for keeping the gas and water fittings ledger and the despatch of fittings accounts which is always done systematically within 48 hours of the job being performed. Also, during the process of printing accounts, he has to agree totals at various stages in respect of hire-purchase items, arrears, credits, supplemental items, &c., all of which are designed as efficient checks to guarantee the accuracy of account, the ledger and the summary.

In the case of the "Addressograph" operator, in addition to the work already specified, the machine is, of course, regularly used for printing weekly wages sheets, time cards, wages envelopes, water rentals, name sheets for prepayment records, and such like work of a routine nature. He also assists generally in regard to wages and also has charge of a "Roneotype" printing machine, which proves of great service to the Department.

Cost.

The question of making any reliable direct comparison between the cost of working the old system and the new is rendered difficult by the fact that during the past six years the total number of gas consumers has increased by nearly 2000, or 25%, and water consumers approximately the same, while, as already stated, the whole of the work of the office has been re-organized and many additional

internal operations performed, which greatly adds to the results. On the other hand, up to 1930 hire of apparatus was charged alike to ordinary and prepayment consumers, but from April 1, 1930, the price of gas to prepayment consumers was adjusted so that each consumer became entitled to one cooker and one fire free of hire. This obviously meant fewer accounts for hire of apparatus. But against this, the concession, together with the increased demand for gas apparatus, has resulted in many additional cookers and fires being fixed as well as boilers, coppers, &c., and the whole of the work of recording naturally falls on the rental office staff. Actually the total cost to-day is somewhat higher than the total cost formerly, but when we take into account our extra 2000 gas and water consumers, and the advantages gained generally, we consider that, for the slight added gross cost, we obtain wonderful value.

The proved advantages are greatly to the benefit of the Department in its relations to its customers and provide many additional safeguards. Further, the work of the office is kept up-to-date daily, allowing any statistical or other information to be supplied immediately it is required. All the members of our staff work with the greatest keenness, and a splendid spirit of co-operation prevails throughout the whole Department. The cash value of this cannot be assessed, but it is a most valuable asset.

In conclusion, I can commend such a sytem as we have in operation at Ramsgate to any gas undertaking of a reasonable size, who have not yet departed from the pen-and-ink stage. Up to some seven thousand ordinary consumers, one Burrough's machine and operator only would be necessary, and a further machine and operator would possibly be required for each seven or eight thousand beyond. Where the accounts are gas accounts only and not complicated with water, in my opinion, with an ordinary staff, it should be possible to despatch about 3000 accounts completely finished with arrears, credits, &c., thereon in three or four days, and certainly within the first week of the new quarter. We feel that anyone installing such a system and working it so as to give the best results will be well rewarded by the increased efficiency all round and by the promptness with which such a system, combined with a system of discounts, ensures payment of accounts.

I have to express my thanks to the members of the Gas and Water Committee of the Ramsgate Corporation for granting the necessary permission to compile and present this paper, also to Mr. Hubbell, our Rental Superintendent, and rental staff for valuable assistance, cheerfully given, in preparing it.

Discussion.

Mr. C. F. Botley (Hastings) said that many of them were interested in this particular matter at the present time, and the paper was a striking testimony of the change of aspect which had come over Associations like their own in having a paper on this type of subject. Many like himself were looking into this question of mechanization, but one had to bring it about gradually and be sure of the steps one was going to take. He asked if Mr. Sale did not consider that it would have been wise to have a regular system of meter reading and collection instead of adhering to the quarterly periods. Instead of having monthly accounts, would it not have been better to accept accounts at quarterly periods, but not necessarily at quarter days? Mr. Sale had mentioned "slot" and "prepayment" meters. Most of them regarded these as the same thing. Would Mr. Sale explain the difference? The matter of discounts was interesting. The author had given figures of 8·83% and 7·03% as the amounts outstanding at the end of the quarters at June 30, 1927, and June 30, 1932, respectively. The corresponding figure at Hastings was 3%. It did not seem that the discount had the effect they would like to see.

Mr. D. C. Cross (Lea Bridge) said that it had come as a surprise to most of them to learn that accountancy machines could be used by a small undertaking for quarterly accounts. The rental staff could get through the accounts in five or six weeks in the quarter, and therefore the only advantage that appeared to accrue from the installation of these expensive machines was that it was made possible to do the work in this period instead of eight or nine weeks. Therefore he could hardly see how it could pay to put in expensive machines for the collection of quarterly accounts. However, he welcomed anything which brought any department into a higher state of efficiency, and Ramsgate had gone into this question very closely and had made their Department more efficient. Two years ago, continued Mr. Cross, they had mechanized the whole of their rental department for monthly accounts. He suggested that it paid them to deliver accounts by hand; Ramsgate posted their accounts, but his Company could get them delivered for one-sixth of a penny each; and this was a big saving over the year. Mr. Cross said that he employed a semi-disabled man to deliver the gas accounts, who was able to deliver 700 or 800 per day. Mr. Botley had mentioned a figure of 3% for the amount outstanding. In the London district it was common practice to get below 1% or even ½%, and his Company used regularly to get down to 0·3% at the end of the quarter. He had also tried the experiment of discontinuing the use of collectors, and found that they were not indispensable to the Company. The great advantage of these machines was in the balancing of the accounts. One could keep a carbon copy which assisted the department in obtaining a more efficient statement. In conclusion, Mr. Cross said he would like to congratulate the Ramsgate Gas Department in making the change over.

The Author's Reply.

Mr. F. C. Sale, replying, said that the question of monthly accounts had been gone into in Ramsgate, but possibly they were rather more conservative there than in other parts of the country, and the matter had been left to be adopted at some future time. The prepayment meter, as differentiated from the slot meter, was, of course, the "stop-action" meter which was invented by Mr. Valon, and was now used only in Croydon and Ramsgate. There was about the same number of each on the Ramsgate district at the present time, though the stop-action meters were gradually being replaced by the slot type. Their figure of 7% was the net figure after taking into consideration every penny coming in. If taken on the gross figure it was in the neighbourhood of 4%. In regard to the delivery of accounts by hand, they did this for years—but perhaps they were unlucky. They found whole batches of accounts not delivered; they had been either burnt or destroyed. So they decided to post them as a safeguard.

The President remarked that they could adapt their system to monthly accounts, but they had to remember that the Gas Department had to dovetail water accounts with the gas accounts. He thanked Mr. Sale for the trouble he had gone to in preparing the paper.

London and Southern District Junior Gas Association

Twentieth Annual Dinner and Dance

A most enjoyable evening was spent at the Florence Restaurant, Rupert Street, Piccadilly, on the evening of Friday, Nov. 18, when a large gathering of members of the Association and their guests supported the President, Mr. A. Tennant, of the East Surrey Gas Company, at the Twentieth Annual Dinner and Dance.

Among those seated at the top table, besides the President and Mrs. Tennant, were Mr. J. R. W. Alexander, Secretary of the Institution of Gas Engineers, Mr. H. C. Smith, Chief Engineer of the Tottenham and District Gas Company, Mr. W. H. Bennett, Managing Director of the East Surrey Gas Company, Mr. Stephen Lacey, Controller of Gas Sales of the Gas Light and Coke Company, Mr. W. J. Sandeman, General Manager of the Croydon Gas Company, and Dr. J. N. Long, the new Principal of the Westminster Technical Institute, where the Association have for many years held their technical meetings.

The Toasts.

The Loyal Toast having been honoured at the call of the President,

Mr. W. H. Bennett proposed the toast of "The London and Southern District Junior Gas Association," with which he coupled the name of Mr. Tennant. He welcomed this opportunity of once more meeting the members of the Association, particularly as he had been one of those present at their inaugural meeting with their Chief Engineer, Mr. Scears, thirty years ago. His Company, the East Surrey, had always taken a special interest in this Association, for Mr. Scears had been an Hon. Secretary, and now their Sales Manager, Mr. Tennant, was the President. They were very much indebted as a Company to the good work and attention to technical knowledge which was maintained by the Association during the last thirty years, and he hoped that the seniors appreciated this as he did. Most of their meetings were held out of business hours, with the exception of two or three visits, and the seniors should be particularly indebted to the members for giving up so much time to the advancement not only of their own Association but of the Gas Industry in general. If the benefits of the Association were not appreciated by the managements of the members' undertakings as they should be, he would take this opportunity of calling attention to them. He would suggest that the least the managements of the undertakings whose members were represented there on that occasion could do was to assist the members generally in attending the meetings by giving them time off when necessary and by paying their subscriptions and other expenses. He had no misgivings that Mr. Tennant would carry through his duties as President with great credit to himself. He understood that it was customary for the Association

to visit the works or district of their President during his year of office, and he was glad to learn that they were to visit the East Surrey district next April.

The PRESIDENT, acknowledging the toast, said he would like to thank Mr. Bennett for the manner in which he had proposed the toast of the Association and those present for the cordial way in which they had received it. He felt it a great honour to be asked to respond to the toast, and he did so, not with any personal feeling of importance, but with a sense of pride for the Association that he as their President represented on this occasion. He took the opportunity of thanking his Chief for the support he had given him, not only by being present that evening, but for the help and encouragement he had shown him in the fulfilment of his office as President. He was pleased to see his colleague, Mr. Scears, present. He also acknowledged the excellent services of their present Hon. Secretary, Mr. Higton. It was he, said Mr. Tennant, who was chiefly responsible for the management of the Association. The efficient manner in which he carried out his duties reflected great credit to himself and the organization. It would indeed be ungrateful on his part, he continued, if he did not express his thanks to the officers for their assistance. They were very fortunate in having a Council who could be relied upon to conduct their affairs in an able manner. He was pleased to say that their financial position was satisfactory.

He thanked them all for their support that evening, and extended a welcome to those ladies and gentlemen who were their guests. It afforded him very great pleasure to have as one of his guests Mr. W. J. Sandeman. He owed a great deal to Mr. Sandeman for his guidance during the many years he had served under him with the Croydon Gas Company. This Association was numerically the largest Junior Association in the country—their membership at present was 420. The Institution of Gas Engineers had been pleased to award their Bronze Medal to members of this Association for the past two years—*i.e.*, since it had been available for competition.

"THE VISITORS."

The toast of "The Visitors" was submitted by the Senior Vice-President, Mr. H. C. SIMS, A.M.I.Chem.E., of the South Metropolitan Gas Company, who said that it was an honour to have gentlemen of such prominence in the Gas Industry with them that evening. It showed a spirit of real friendship. They were very fortunate in their friends, and it was due to their sympathy, help, and sound advice that their Association held the prominent position it did to-day.

Mr. STEPHEN LACEY, responding to the toast, said they had enjoyed themselves very much, and thanked the Association for the pleasant evening. The members of their Association worked very hard, and, as Mr. Bennett had said, most of their meetings were held after office hours—which was more than most other Associations could say. There was a great deal of pleasure in their work in the Gas Industry, and they were enthusiastic about it. A Junior did not necessarily imply great youth; but the Juniors were looking forward and not back—that was his impression of the Juniors. The London and Southern District Junior Gas Association, he continued, was particular as to whom were admitted to membership; and it was interesting to look back and see what the original qualifications for membership used to be, compared with those of the present time. To-day they were not satisfied with anything less than the Ordinary Grade Certificate of the Institution of Gas Engineers for associate membership, while the qualification for full membership was the Higher Grade Certificate. Yet, in spite of this tightening up, the Association had continued to grow, and during the last ten years their membership had increased from 244 to 420—which was a very fine achievement. He concluded by wishing the Association and their President a most successful season.

The speeches were interspersed with an excellent programme of variety entertainment, while the remainder of the evening was devoted to dancing.

"Rivets or Welds?"

Lecture to the Yorkshire Junior Gas Association

At a meeting of the Yorkshire Junior Gas Association on Nov. 19, Mr. H. H. Hollis, Managing Director of the Oxley Engineering Company, Ltd., Leeds, gave a lecture, illustrated by lantern slides, drawings, and specimens, in which he compared the relative merits of riveting and welding. The meeting, held at the Griffin Hotel, Leeds, was presided over by Mr. J. W. Wood, M.Sc., the President.

"RIVETS OR WELDS?"

By H. H. HOLLIS.

[EXTRACT.]

About twelve years ago, when I first took an active interest in electric welding, I had the belief that the process of electrically welding with a metallic arc was fundamentally sound and offered many economies in the construction of steel vessels for the various trades. Subsequent events fully justified my belief.

The essentials of a good riveted joint are: Correct design; accurate workmanship, marking off, and drilling; all parts to be riveted together must be dead close before riveting; all rivet holes in true alignment; heads of rivets to be concentric with the rivet holes, and of sufficient size and shape; correct heating of the rivet; rivets to be well and truly driven and must fill the rivet holes; in the actual riveting, every care is necessary to ensure a good job. In hydraulic riveting too much pressure must not be applied, and sufficient "dwell" must be allowed. The holding-up of the rivet must be dead solid, particularly with pneumatic riveting. In hand riveting, the size and shape of head must be maintained and the riveters must fall back one (or two) to tighten up the rivet.

The essentials of a good welded joint are: Correct design; quality of electrode (this is most important); suitable equipment; correct amperage and voltage for the various sizes of electrodes, again very important; correct assembling and tacking together of the work; method of welding to counteract contraction and distortion; proper penetration; homogeneity of weld metal, which must be free from porosity and slag inclusions.

It is impossible to construct a riveted joint to give 100% efficiency. It is possible to construct a welded joint easily to give this efficiency.

DETECTION OF DEFECTS.

The methods of detecting faulty riveted joints are well-known.

Odd rivets are cut out to ascertain if holes are in true alignment and if the rivet shank has filled the holes; the rivets are sounded for tightness by tapping with a light hammer; pitches measured for jocky caps; in hand riveting, see that the head of the rivet is flush up to its work; see that the point of the rivet has been hammered down to its correct shape; examine for burnt rivets; in pneumatic riveting, particularly examine for loose rivets and see that the snap has not cut into the plates. In dished and flanged work, the hydraulic riveter can cover up many faults in the forming of the parts. All riveted joints, particularly hydraulic, should be carefully examined before riveting, to see that the various surfaces are in close contact.

I say definitely that the examination of riveted joints by inspecting engineers is not as thorough as it might be.

There are many methods of testing welds for defects, some very elaborate and expensive, including X-ray, acoustic, and magnetic methods. There is a further method, which originated in Germany. Oval holes are milled through the weld by an electrically driven vertical milling machine which is tack welded on to the top of the joint. The machined surface can be etched to show each layer of metal where there are a number of runs, and the junction of the weld and the parent metal. There are, however, quite a number of simpler methods. Here are a few "tips" which I would give to an engineer who has had practically no experience in electric welding, and which will assist him in inspecting welds.

(1) First, and this is extremely important, specify asbestos-wound electrodes. Personally, I have found no electrode to beat the Quasi-Arc, and you cannot possibly go wrong with respect to electrodes if you insist that all must be Quasi-Arc or equal. Have nothing to do with paste-covered electrodes, and shun bare wire electrodes like the plague.
(2) Examine prepared parts before welding.
(3) Watch (through coloured glass screen) length of arc, which should be as short as possible.
(4) See that correct amperage and voltage are used (particulars for the various sized electrodes would be given to you).
(5) If more than one run, carefully examine the first run and see that there is full penetration.
(6) See that there is no excessive under cutting after the final run.
(7) Cut across and down the weld with a diamond-point chisel, and examine for penetration and soundness of deposited metal.
(8) Get the operator to weld you a small piece of ¾-in. plate about 4-in. square on, say, a stanchion in the works, and this must withstand shock blows with the

hammer until knocked over flat without fracturing the weld.

Advantages.

The only advantage which riveted joints have over welded is where, say, a storage tank is likely to be taken down and re-erected on another site; whereas welded joints have very many advantages over riveted. To name a few:

(1) Less cost in many cases.
(2) Greater strength and rigidity, with fewer component parts.
(3) Increased speed in construction. Numerous operations necessary in riveting may be dispensed with entirely in many cases.
(4) Silent construction; unnecessary noises should not be tolerated.
(5) Practical elimination of the inherent limitations of riveted joints and the need for correcting fabrication errors during erection.
(6) During erection, alterations and additions are easily accomplished.
(7) No leaking seams, due to sudden changes in temperature conditions.
(8) Improved appearance.
(9) Welding scores very heavily over riveting in the construction of gasholders and tanks. A gasholder bell can be welded up to be one homogeneous whole. With oil filmed holders there is no danger of the oil getting into the seams, corroding the tape, and causing leaks. The recent discussion on this matter, as reported in the Technical Press, is very illuminating. Why use tape at all when the lap joints of the side sheets can be welded both sides cheaper than a riveted design, the joints giving 100% efficiency against 40% on riveted joints?
(10) In the repairs to gasholders and tanks, welding has a distinct advantage over riveting. My firm has carried out a considerable amount of work in this respect.

Design.

The application of electric welding is widespread. It offers many improvements in the design of gas-works plant. The technique of this designing is not easily acquired. Many a designer has failed because of his inability to visualize a piece in the light of new methods. If a designer is unable to break away from the old traditions of riveting practice, he cannot hope to be a successful designer of welded structures. Welded steelwork is taking the place of castings.

Conclusions.

(1) The successful future of electric welding as a method of steel construction is assured. In connection with gas-works plant, electric welding can, with considerable advantage over riveting, be used in the construction of all plant from the retort house to the gasholder.
(2) The objection that the engineer is completely in the hands of the operator is no longer tenable. The engineer can personally control the conditions of work and the supervision necessary to ensure sound results.
(3) The production of a metallurgically sound weld under practical conditions should not depend entirely upon the skill of the operator but on the natural functions during fusion of the electrode.
(4) Success in welding construction depends on the initiative shown by the designer, and his ability to break away from the existing practice developed essentially for riveting.
(5) British engineers are proverbially conservative, and hate changes of any sort, even if the change can be justified from every point of view. Before substantial advance can be made with the introduction of a fresh technique into the realms of the gas engineer and others, there must be widespread acceptance of the idea that this fresh technique can be relied upon with full confidence. Revolutionary discoveries do not happen every day. When they do, it is vitally important that they should be made known to you. Study very carefully what has already been accomplished. Anyone who is content to-day to stick to the practices of yesterday is a back number who has failed to recognize the spirit of the times.
(6) There has probably been more research work done in electric welding during the past ten years than in sixty years in connection with riveting.

I desire to pay tribute to the vast amount of research work carried out by suppliers of electrodes, particularly by the Quasi-Arc Company, Ltd.; but there should be more co-ordination of effort.

Compilations of suitable regulations covering arc-welding work should be available for all bodies requiring such, in the interests of public safety. Electric welding must be surrounded by certain well-recognized safeguards to prevent incompetent and irresponsible individuals from attempting a more widespread use of this method of construction.

I am not *au fait* with the movements of the Institution of Gas Engineers and the Society of British Gas Industries regarding the drafting of suitable regulations for your trade, but in my opinion this is a matter of urgent necessity and of supreme importance.

Discussion.

Mr. L. R. Cowley (Shipley), opening the discussion, said he was interested in the advantages of welding, as against riveting, but wondered whether there was not a possibility of a certain amount of chemical change taking place in the steel owing to the penetration of the weld. If there was any such possibility, what effect was it likely to have on the strength of a plate?

Mr. Hollis, replying, said undoubtedly with bare wire or paste-covered electrodes there was a likelihood of such chemical change in the parent metal, owing to atmospheric gases getting into the deposited metal. What they were chiefly concerned with, of course, in this matter of welding, was strength of weld and the life of the parent metal adjoining the weld. The pictures had shown the seriously corroded effect of bare wire welding after only two years. A chemical change was set up in the parent metal and resistance to corrosion reduced. The same thing happened, in less degree, in the case of paste-covered electrodes, but with Quasi-Arc electrodes, or electrodes of similar character, there was not this effect at all, as he had been able to illustrate by the pictures and specimens. The high-quality electrode was prepared definitely to avoid such effects, and no user need have any worry about chemical change sufficient to affect the parent metal in its resistance to corrosion.

Mr. D. T. Livesey (Doncaster) asked whether, instead of using expensive proprietary electrodes, there was any objection to dipping ordinary bare wire electrodes into some suitable paste equal in efficiency to the covering of the proprietary electrodes? These, he presumed, were themselves paste-covered. Mr. Livesey said he had no fault to find with electric welding, and he was not particularly attributing to that the failure of some welded boilers he had in mind—the failure in that particular case was probably due to the bad effects of the local water. The manager of the firm who did electric welding at the Doncaster Undertaking was always careful to see that the electrodes were covered with a flux and it struck him (Mr. Livesey) that other pastes might be equally as good as that of the particular make of electrode mentioned specially by Mr. Hollis. Would the author be prepared to put in a boiler of, say, 200 lbs. pressure, electrically welded entirely, without any rivets at all? Mr. Livesey remarked on the fact that Mr. Hollis, in his lecture, had not touched at all on acetylene welding as distinct from electric, and it would be interesting if he would give an opinion on the relative merits of the two systems.

Mr. Hollis said the difference between paste-covered electrodes and the Quasi-Arc type was that the latter were covered not with paste, but with asbestos fibre—a much more efficient covering. Many firms had their own particular preferences in pastes for covering, but the makers of the Quasi-Arc had tested every paste-covered electrode they could get hold of, and found them inferior. The main function of most paste coverings was not to protect the molten weld metal from atmospheric gases, but to render the electric arc more stable and enable a shorter arc to be drawn than was possible by bare wire. If Mr. Livesey would care to send one of the electrodes he had in mind, he (Mr. Hollis) would be glad to have it tested. Incidentally, the paste-coated electrode was very cheap compared with the high-quality fibre asbestos wrapped electrode.

In answer to the question as to welding entirely a 200 lbs. pressure boiler, the answer was definitely "Yes," if the authorities would permit it. In the chemical industry, his firm had supplied welded vessels tested at 850 lbs. and working at 500 lbs. pressure at high temperatures; and immediately the authorities would frame regulations to meet the development they would soon have solely welded boilers and pressure vessels in other industries. Acetylene welding was an advantage on very thin metals—say, 20 gauge material, &c. His own experience was in favour of electric welding on metals from, say, 12 or 14 gauge upwards, because the heat from the electric arc was concentrated, and one did not get as much distortion as in the use of acetylene welding. The latter certainly had its advantages on very thin metal, where one was inclined to have some difficulty in electric welding—though experiments were being made to overcome that difficulty.

Mr. B. Thorpe (Huddersfield) asked whether Mr. Hollis preferred lap or butt welding. One method was perhaps better than the other for certain jobs. In tar stills, said Mr. Thorpe, no matter how good a job might have been made of a riveted still, one usually found stalactites of pitch coming through the concave bottom, and that, of course, meant leakage. What effect would the constant changes of temperature in a tar still have on the bottom of a welded still? Further comparing riveting and welding for this kind of plant, Mr. Thorpe remarked that the old type of still with a riveted dome top had a rise of about 2 ft. At Huddersfield they had a new one with a welded top, all in one piece, with only 1 ft. rise.

Mr. Hollis said that wherever practicable he preferred the lap joint. It was easier to put down a fillet weld than to

fill a vee in a butt weld, and particularly where one was welding both sides one got a stronger job with the lap. There were, however, circumstances in which the lap weld was not convenient, and there were many very strong jobs with butt welding, giving excellent results. In a job on gasholder sheeting, for instance, he would prefer the lap welded joint if at all possible. In regard to tar stills, the bottom plate, of course, is now usually made in one piece. The effect of the heat in electric welding depended on the material itself. His firm had built new segmental bottoms in cresylic stills and tar stills, and had cut out the old riveted bottoms and had welded in new bottoms—butt welded—and they had proved very satisfactory indeed, particularly in the case of the cresylic stills. Welding, properly done, was, in the view of Mr. Hollis, a far better job than riveting in such cases as still bottoms, fire boxes, and vessels subjected to changing temperatures, because it avoided the springing of riveted parts.

Mr. F. FIRTH (Leeds) asked why, in view of the author's preference for lap welding, a case of a repaired fire box which had been mentioned and illustrated in the course of the lecture had been butt welded. One would have thought that was distinctly a case where lap welding would be a surer job. Mr. Firth said that in regard to heavy metal one would imagine there might be a difficulty in electric welding due to loss of conductivity in taking the heat away before one got to the metal. He thought one of the reasons for non-success in acetylene welding on thick material was this question of concentrating heat sufficiently long to get the heat into the metal.

Mr. HOLLIS said that wherever possible they endeavoured to fillet or lap weld; but in cases such as boilers, tar still bottoms, &c., it was important to avoid any uneven thickness of the plates. In the repair mentioned by Mr. Firth, it would have been easy to have fitted a plate on and fillet welded, but this would have been bad practice. Whenever heat was applied, they should aim at a uniform thickness of material. One of the unfavourable factors of riveting such work was that it left this undesirable unevenness on the plates. In regard to the question of getting heat into heavy material, Mr. Hollis illustrated by sketches on the blackboard the limitations of acetylene welding when dealing with thick material; considerable heat was necessary, and in the example given it was not found possible to weld by acetylene. The difficulty was overcome by electric welding.

A MEMBER: The point you are making, I think, is that with electric welding you strike your arc and commence welding immediately, whereas you cannot do that with acetylene welding

Mr. HOLLIS: That is so.

Mr. J. RICHMOND (York) remarked that no mention had been made either by Mr. Hollis or in discussion in regard to the practicability of electric welding on small castings, such, for instance, as mouthpiece lids, &c., at the gas-works. It seemed to him that a welded mouthpiece would be almost indestructible, and would be very valuable, unless, of course, the cost of welding was too great. Did Mr. Hollis think it wise to use electric welding on cast-iron work?

Mr. HOLLIS said that in dealing with cast-iron work so much depended upon the metal itself. Cast iron was about the most treacherous of metals, and one would not venture to guarantee results unless one were absolutely satisfied as to the exact composition of the casting. There had, of course, been many excellent results in welding on cast iron, but the trouble was that cast iron might be anything from a first-class material down to a product of very common pig and a bad mixture of scrap. Usually, cast iron was very brittle, and therefore difficult to deal with by electric welding, especially when there was complete uncertainty as to the nature of the iron.

In answer to a suggestion by Mr. Richmond, Mr. Hollis agreed that in welding cast iron it was desirable to pre-heat the iron up to a determined temperature prior to welding, and let it cool off steadily. This was certainly a useful safeguard.

The PRESIDENT, in voicing the thanks of the meeting to Mr. Hollis, said they had had a most interesting lectrue, and one which any young engineer, particularly if engaged on the structural side of a gas undertaking, would do well to study closely.

Mr. HOLLIS, responding, said that, in view of the necessity to curtail the discussion owing to limitation of time, he would be glad to send replies to any questions that members might subsequently feel inclined to write to him.

Oriental Gas Company

ANNUAL GENERAL MEETING

The Annual General Meeting of the Oriental Gas Company, Ltd., was held on Thursday, Nov. 24, at the Offices of the Company, Finsbury House, Blomfield Street, E.C. 2—Mr. STANLEY H. JONES, M.Inst.C.E. (the Chairman), presiding.

The SECRETARY (Mr. S. Rainer) read the notice convening the meeting and the report of the Auditors, and the report of the Directors and the statement of accounts for the financial year ended June 30 last were taken as read.

The CHAIRMAN, moving the adoption of the report and accounts, said:

I am sorry to say that our colleague, Mr. Macleod, is not with us to-day, as he would have wished, but he has had to go abroad on important business and wishes me to express his sincere regret at his enforced absence.

The year covered by the accounts before you to-day has been a period of continued world-wide trade depression, as was the case in the preceding year, and India, like other countries, has felt the full effect of this. In consequence, the Company's business has been adversely affected to some extent, and we must be thankful that the reduction in the sale of gas has not been greater than the comparatively small decrease of 1·2% mentioned in the report.

The most important event that has occurred during the Company's trading year has been the arranging and putting into operation a new agreement with the Corporation of Calcutta for the public lighting of the City for a period of seven years from Feb. 1 last. It is four years since I mentioned that we had commenced negotiations with the Corporation, so you will appreciate what a long business it has been, and all concerned are, I am quite sure, heartily glad to see the end of the long drawn out proceedings. Under the terms of the new contract the Company has to supply gas of a minimum calorific value of 450 B.Th.U. instead of gas of specified candle-power of 14 candles, and the price to be paid by the Corporation has been reduced by 8 annas per 1000 c.ft. to 2 rupees per 1000 c.ft. This price is based on an annual consumption of gas by the Corporation for all purposes of not less than 247,000,000 c.ft. and not exceeding 285,999,900 c.ft. Should the former figure not be reached the price is to be increased under a scale, and should the latter figure be exceeded a reduction is made down to a minimum price of 1 rupee 14 annas. The Corporation has the right to increase or decrease the number of public lamps, but the number they may discontinue is at a restricted rate. The Company is at liberty, if they so desire, to manufacture gas from sources other than coal, which hitherto they have been unable under the terms of the former contract to do, being restricted to the use of coal only. The agreement is, I think, a fair one to both parties.

As I have said, the negotiations have been very protracted and have made great calls on our Manager's and Assistant Manager's time, and our best thanks are due to them. I should also mention in this regard that we were greatly assisted by Mr. Lane, the Manager of the Bombay Gas Company, who made a special visit to Calcutta to meet the Corporation representatives and point out how successfully Bombay City was lit with gas on a calorific standard very similar to the standard now adopted in Calcutta. Our best thanks are due to Mr. Lane for the great help he gave us.

THE ACCOUNTS.

I will now pass to the accounts. The capital account remains as before, all expenditure having been met out of revenue. In the revenue account coals cost £33,861, as compared with £35,391 in the previous year, a saving of £1530; the tonnage carbonized was 49,656 tons, as against 51,786 tons—a reduction of 2130 tons, due to a higher make of gas per ton and less gas being sold. Salaries and wages in the manufacturing department were slightly more; purification was about the same, and repairs and maintenance more by £2672, due to repairs to No. 3 gasholder and retort renewals, &c., the total manufacturing cost being higher by some £1331.

Under the heading of distribution, salaries and wages were slightly less; repairs and renewals of mains and services were less by £1330; repairs and renewals of meters were less by £2103; and fittings and stoves were less by £5117. Total distribution costs were less by £8639.

Public lamp expenditure was less by £759. Under the terms of the new public lighting agreement two districts, Cossipore-Chitpore and Manicktollah, in which the lamps had been maintained by the Company were embodied in the area of Calcutta in which the Corporation maintain the lamps.

Rents, rates, and taxes were slightly higher by £294. Directors 'and Auditors' fees and salaries were slightly higher, mainly owing to the higher rate of income-tax. Stationery was somewhat less. General charges were less by £843, but this was due to insurance costs against fire, third party risk, workmen's compensation, and cash in transit risk, amounting to £1094, which were, 'except as regards workmen's compensation, included under this heading last year, being put under a separate heading this year. Law charges and superannuations were slightly less. Passages were up by £349 owing to more officials being

on leave. Bad debts were £38. Total expenditure was less by £7092.

On the receipt side gas rental was less by £6640, due to the lower price paid by the Corporation and decreased private revenue. Rentals of meters and stoves were about the same.

Residuals.

As regards residuals, coke and breeze brought in less by £2543. Tar receipts were better by £1343. There was a slight loss on sulphate of ammonia. The total receipts from all sources were £142,205, as compared with £150,297—a reduction of £8092. The balance of profit of £29,253 was less by £999 than last year.

In the net revenue account you will see that we have received £536 from bank interest on deposits; the interest on investments was £538, and exchange profit was £6832—an improvement of £500.

The reserve fund remains as before, and the depreciation, renewals suspense, and exchange equalization accounts are unchanged.

I have referred to the coal tonnage carbonized.

As regards residuals, we sold 22,946 tons of coke, as against 23,995 tons; 1561 tons of breeze, as compared with 2142 tons; and 558,833 gallons of tar, as compared with 607,381 gallons.

Turning to the balance-sheet, you will notice we have increased our investments by nearly £10,000 to £25,610, and our cash reserves have increased to £23,241. There are two items I wish to refer to in the balance-sheet—namely, the amounts due by the Company, £17,347, and the amounts due to the Company, £1386; and as the disparity may appear very great, I would explain that in the amounts due by the Company there was an unusual amount of £6931 for re-sheeting and renewing the internal framing of our No. 3 gasholder, and on the other side of the account the figure of £1386 is a net figure after deducting the reserve for bad debts and consumers' deposits.

The Manager reports that, with the exception of No. 3 gasholder now under repair, the Company's buildings and plant are in good and serviceable condition. The Company has fully complied with its obligations as regards quality and pressure in connection with the supply of gas.

Relations with the Public Authorities have been amicable, and the conduct of our employees has been quite satisfactory; and we are grateful to our Manager and his staff and the employees generally for their good work.

Referring to the future, we regard the outlook as not unfavourable, and hope for an improvement in the trading conditions of India, which should conduce to further development of the Company's business.

The Directors propose a dividend of 4½%, less tax.

The resolution was formally seconded by Mr. B. W. Ellis, A.M.Inst.C.E., and carried unanimously.

Dividend.

The Chairman then moved:

> That a dividend of 8%, less income-tax, be declared for the twelve months ended June 30, 1932, less 3½% paid on account on May 31 last, and that warrants for the same be sent by post to the proprietors on Nov. 24.

Mr. B. M. Gill seconded the resolution, which was carried unanimously.

Re-Elections.

Mr. W. G. Bradshaw, C.B.E., moved the re-election of Mr. Stanley H. Jones, being the Director retiring by rotation, remarking that after an intimate acquaintance with Mr. Jones extending over forty years and with his work and qualifications he could unreservedly recommend this resolution.

Mr. Gill seconded the motion, which was unanimously agreed to, and Mr. Jones briefly returned thanks.

On the proposition of Mr. J. A. Fletcher, seconded by Mr. H. Fletcher, the Auditors of the Company, Messrs. S. W. Savage and F. J. Bradfield, were re-elected, and Mr. Bradfield acknowledged.

Votes of Thanks.

Mr. B. W. Ellis, proposing a vote of thanks to the management in Calcutta, the Secretary in London, and the whole staff of the Company both in India and at home, referred to the satisfactory conclusion to which Mr. Garsed, assisted by Mr. Savage, had brought the long negotiations with the Corporation of Calcutta in regard to the public lighting of the City—which had been satisfactory to both parties. The above officials, assisted by Mr. Gladstone, Mr. Carlisle, and Mr. Pope, had efficiently conducted the affairs of the Company in India during the absence on leave of Mr. Smith, Mr. Morrison, and Mr. Bathgate. While at home the three latter had devoted a good proportion of their time to inspecting and selecting suitable material and apparatus to be utilized by the Company. They could see from the slight fall of 1·2% in the sales of gas during the year what a close grip all their staff kept on their affairs. Coming to London and the staff there, they had Mr. Rainer, whom he could remember in the office as long ago as 1891, and, to echo the well-known saying, was "still going strong." He, with his staff in London, carried on their work on the high standard they had always maintained. Both to them and to the staff in India they owed their thanks.

Mr. Bradshaw seconded the vote, which was carried unanimously.

Mr. Rainer, acknowledging the vote of thanks on behalf of the staff as a whole, thanked them for the kind remarks made, and said it would give him much pleasure to convey them to the staff in Calcutta.

Mr. Bradfield proposed a vote of thanks to the Chairman and Directors for their conduct of the business during the past year. The fact that few shareholders attended their General Meetings was a compliment to the Directors in that it indicated confidence in them and the knowledge that they were going to receive a satisfactory dividend. He congratulated the Directors on the success of the Company, and added that the very small decrease in the sales of gas was indicative of their efforts as well as those of the staff. The disturbed conditions in Calcutta were so great that it was marvellous they should have had such satisfactory results.

Mr. R. H. Glen seconded the vote, and remarked that when in India recently he had visited their works in Calcutta, and would like to thank the Directors for permission to do so. He saw what a good condition the works were in, and he was very glad that they had at last reached a satisfactory agreement with the Corporation in regard to the public lighting. He had also taken the opportunity of inspecting some of the larger gas installations in flats and hotels in Calcutta, and he considered that the Company were doing wonderfully well in this respect. They only had to see these installations to realize the energy displayed on the fittings side of their business. In conclusion, he referred to the Company's new showrooms, and inquired whether these were proving satisfactory.

The vote of thanks was carried with acclamation, and, in reply,

The Chairman said that it was very pleasing to receive this vote. Mr. Glen's account of his visit to their works was very interesting, and it was gratifying to the Board to find a Director of another gas undertaking [Mr. Glen is on the Board of the Colombo Gas Company] troubling to visit their undertaking. Regarding their new showrooms, they had, of course, rather insignificant premises before, although they were in a good situation. They now had a showroom worthy of the Company, and he believed it was justifying its existence, though they could never quite show by receipts the actual value of such premises; it was the propaganda value which really counted. When things looked up in India he was sure they would be of great help to the Company. He was much obliged by the vote of thanks, and hoped that their results would be equally satisfactory next year.

This concluded the business of the meeting.

Parliamentary Intelligence.

[From Our Special Correspondents.]

House of Lords.

Special Orders.

The following Special Orders have been laid before the House and referred to the Special Orders Committee: Borough of Buxton; Grantham Gas Company; Hampton Court Gas Company.

Joint Committee on Basic Prices.

Arising out of the Bath Gas Order a Joint Committee of both Houses has been appointed on the motion of the Earl of Onslow to consider further the question of Basic Prices for Gas Undertakings.

The motion was as follows:

That it is expedient that a Joint Committee of both Houses of Parliament be appointed to consider and report whether, as one of the methods of giving effect to the basic price system of charge by gas undertakers in those cases in which a power to make a differential charge in respect of any part of the existing or intended limits of supply is proposed to be continued or granted, it is expedient to authorize a separate basic price in respect of each such part, arrived at by adding to the basic price fixed in respect of the area for which no differential charge is proposed a sum representing the differential charge as proposed to be authorized or continued, or as actually made.

House of Commons.

Special Orders.

The following Special Orders have been presented and ordered to lie upon the Table of the House: Borough of Buxton; Grantham Gas Company; Hampton Court Gas Company.

GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

Affairs on the Stock Exchange last week were overshadowed by the uncertainty regarding War debts payments and the consequent wide fluctuations in the exchange value of sterling. At the outset gilt-edged securities suffered rather severely, but a rally towards the close brought prices up to within a small margin of those ruling the previous week. In other markets there were few changes, and the undertone remained firm.

The Gas Market remained unaffected by the general situation, and an appreciable volume of business was recorded. Several issues showed substantial improvement in value—*e.g.*, the £1 ordinary shares of the Colonial Gas Association were marked up 1s. 9d. to 18s., and the 8% preference shares 1s. 3d. to par; on the Newcastle Exchange South Shields consolidated improved 7½ points to 142½; and on the London Exchange Maidstone 5% (last year's dividend 9%) and Portsmouth 4% (last year's dividend 8%) both gained 5 points to 165 and 152 respectively.

There are a few 5% maximum dividend stocks in the list which if procurable at somewhere around the current middle market price give a yield in the region of 5%, and should prove satisfactory permanent investments. Among these are Croydon at 97½, East Hull at 99½, Northampton at 98½, and Portsmouth at 99½.

It is regretted that, through a printer's error, the decrease in the Bournemouth Gas and Water Company's 5% debenture stock was incorrectly stated in last week's Report to be 8 points. This should have read 3 points as shown in the Stock and Share List.

Current Sales of Gas Products.

The London Market for Tar Products.

LONDON, *Nov.* 28.

There is little change to report in the prices of tar products, which are as follows:

Pitch is firm at 100s. per ton f.o.b.

Creosote is 3½d. to 3d. per gallon f.o.b., according to specification.

Refined tar is 4d. to 4¼d. per gallon in bulk at makers' works.

Pure toluole is about 2s. 7d.; pure benzole, about 1s. 11d. to 2s.; 95/160 solvent naphtha is firmer at 1s. 8d. to 1s. 9d.; and 90/140 pyridine bases, 3s. 9d. to 4s.—all per gallon naked at makers' works.

Tar Products in the Provinces.

Nov. 28.

The average prices of gas-works products during the week were: Gas-works tar, 33s. to 38s. Pitch—East Coast, 85s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 85s. f.o.b.* Toluole, naked, North, 1s. 7½d. to 1s. 9d. Coal-tar crude naphtha, in bulk, North, 5½d. to 5¾d. Solvent naphtha, naked, North, 1s. 4d. to 1s. 4½d. Heavy naphtha, North, 10½d. to 11d. Creosote, *ex* works, in bulk, North, liquid and salty, 2½d. to 2¾d.; low gravity, 1¼d.; Scotland, 2¼d. to 2¾d. Heavy oils, in bulk, North, 4¾d. to 5¼d. Carbolic acid, 60's, 1s. 6½d. to 1s. 7d. Naphthalene, £9 to £10. Salts, 55s. to 75s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Nov.* 26.

Few orders are being placed at present, but makers' prices remain fairly steady in all departments.

Crude gas-works tar.—The actual value is 45s. to 50s. per ton *ex* works.

Pitch.—Export value is nominal at 92s. 6d. to 95s. per ton f.o.b. Glasgow. In the home market, 95s. to 100s. per ton *ex* works is being quoted.

Refined tar to Ministry of Transport Specification is rather dull, but prices are steady at 3¾d. to 4d. per gallon f.o.r. naked.

Creosote oil.—Production exceeds demand and values are unstable. B.E.S.A. Specification is 3½d. to 3¾d. per gallon; low gravity, 3d. to 3½d. per gallon; and neutral oil, 3¼d. to 3¾d. per gallon—all *ex* works in bulk.

Cresylic acid.—The position remains weak, with quotations irregular. Pale, 97/99%, is 11d. to 1s. per gallon; dark, 97/99%, 10d. to 11d. per gallon; and pale, 99/100%, 1s. 2d. to 1s. 3d. per gallon—all f.o.r. in buyers' packages.

Crude naphtha is still commanding 4½d. to 5d. per gallon f.o.r., according to quantity and quality.

Solvent naphtha.—Market is still dull, with 90/160 grade quoted at 1s. 2d. to 1s. 3d. per gallon, and 90/190 grade, 11d. to 1s. per gallon.

Motor benzole.—Production is low, and price in bulk is 1s. 4d. to 1s. 5d. per gallon *ex* works.

Pyridines.—90/160 grade is 3s. to 3s. 3d. per gallon, and 90/140 grade 3s. 3d. to 3s. 6d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time.

	s. d.		s. d.	
Crude benzole	0 10½	to	0 11	per gallon at works
Motor ,,	1 6½	,,	1 7	,, ,, ,,
Pure ,,	1 10	,,	1 11	,, ,, ,,

Trade Notes.

"Simplex" Plant for Longridge.

The Longridge Gas Company, Ltd., have placed an order with the Vertical Gas Retort Syndicate, Ltd., of 17, Victoria Street, Westminster, S.W. 1, for an improved type "Simplex" water gas plant.

Contracts Advertised To-Day.

Coal.

The Buxton Corporation Gas Committee invite tenders for the supply of coal. [Advert. on p. 636.]

Gas Oil.

The Corporation of Bexhill invite tenders for the supply of gas oil. [Advert. on p. 636.]

New Capital Issues.

Gloucester Gas Light Company.—As announced elsewhere in this issue, £30,000 of consolidated ordinary (new) stock of the Company will be offered for sale by auction at the Company's Offices on Dec. 16.

Romford Gas Company.—The new issue of £60,000 of 4% redeemable preference stock by this Company, recently advertised in these columns, has all been allotted—at prices ranging from £105 to £102 10s. per £100 of stock.

Newhaven Gas and Coke Company, Ltd.—Messrs. A. & W. Richards have received instructions to offer for sale by tender 5000 £1 additional ordinary shares of the Company. Further particulars are given in the advertisement columns.

Solihull Gas Company.—On Dec. 8 at the Grand Hotel, Birmingham, consequent on a further issue of ordinary capital by the Solihull Gas Company, new ordinary shares of £10 each in lots of ten are to be put up for sale. The number of these new shares will be such as will, with the premiums, produce a sum not exceeding £5173, the dividend on which is limited to 7%.

Gas Acts (1920 and 1929) Orders.

VARIATION OF CALORIFIC POWER.

Edinburgh Corporation.

Notice is given by the Corporation of their intention to alter, as from Feb. 15, 1933, the calorific value of the gas supplied by them from 500 B.Th.U. to 475 B.Th.U.

STOCK AND SHARE LIST.

Official Quotations on the London and Provincial Stock Exchanges.

[For Stock Market Report, see earlier pages.]

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Nov. 26. (Provincial Exchange Nov. 25.	Rise or Fall on Week.	Transactions. Lowest and Highest Prices During the Week.
£			% p.a.	% p.a.				
1,551,868	Stk.	Oct. 8	7⅞	7⅞	Alliance & Dublin Ord. ...	102—112	...	109½
374,000	,,	July 4	4	4	Do. 4 p.c. Deb. ...	80—90	...	...
657,655	,,	Aug. 22	7	7	Barnet Ord. 7 p.c.	132—142	...	...
300,000	1	Oct. 17	1/9⅓	1/4⅓	Bombay, Ltd.	21/—23/-	...	22/6—22/10½
177,750	Stk.	Aug. 22	9	9½	Bournemouth sliding scale	192—202	...	...
550,050	,,	,,	7	7	Do. 7 p.c. max. ...	145—155	...	...
489,160	,,	,,	6	6	Do. 6 p.c. Pref. ...	135—140	...	...
50,000	,,	June 20	3	3	Do. 3 p.c. Deb. ...	75—80	...	...
162,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	100—105	...	...
210,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	122—127	...	⅝
357,900	,,	Aug. 22	7½	7½	Brighton, &c. 6 p.c. Con. ...	140—145	...	...
540,000	,,	,,	6⅔	6⅔	Do. 5 p.c. Con. ...	127—132	...	129—129½
195,500	,,	,,	6	6	Do. 6 p.c. B Pref.	135—145	...	...
1,287,500	,,	Aug. 8	5	5	Bristol 5 p.c. max.	108—110[a]	...	...
120,420	,,	June 20	4	4	Do. 1st 4 p.c. Deb. ...	96—99[a]	...	...
317,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	95—98[a]	...	...
228,790	,,	,,	5	5	Do. 5 p.c. Deb.	115—120[a]	...	...
955,000	,,	Oct. 3	8	7	British Ord.	141—146	+3	139½—145
100,000	,,	June 20	7	7	Do. 7 p.c. Pref.	140—150	...	...
350,000	,,	—	—	—	Do. 5½ p.c. Pref. ...	107—112	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	90—95	...	92
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	105—115	...	...
160,000	,,	July 4	5	5	Cambridge 5 p.c. Deb. ...	117—122	...	...
100,000	10	May 23	6	6	Cape Town, Ltd.	7½—8½	...	...
100,000	10	Nov. 7	4½	4½	Do. 4½ p.c. Pref. ...	6—7*	...	...
150,000	Stk.	June 20	4½	4½	Do. 4½ p.c. Deb. ...	90—95	...	...
626,860	,,	Aug. 8	6	6	Cardiff Con. Ord.	102—107	...	...
237,860	,,	July 4	2½	5	Do. 5 p.c. Red. Deb.	105—110	...	...
157,150	,,	Aug. 8	6½	5	Chester 5 p.c. Ord.	93—98[b]	...	...
98,986	1	Oct. 17	2/-	2/-	Colombo, Ltd. Ord.... ...	25/—30/-	...	...
609,204	1	Oct. 17	-/10'90	-/11'47	Colonial Gas Assn. Ltd. Ord.	17/—19/-	+1/9	17/1½
296,068	1	,,	1/2'54	1/3'30	Do. 8 p.c. Pref.	19/—21/-	+1/3	19/7½—20/3
1,822,505	Stk.	Aug. 8	5⅔	5	Commercial Ord.	104—109	...	105—107
475,000	,,	June 20	3	3	Do. 3 p.c. Deb. ...	74—79	...	78
240,744	,,	—	—	—	Do. 5 p.c. Deb. ...	119—124	...	122—122½
807,560	,,	Aug. 8	7	7	Croydon sliding scale ...	137—142	...	140—141½
469,590	,,	,,	5	5	Do. max. div.	95—100	...	...
500,000	,,	July 4	5	5	Do. 5 p.c. Deb.	120—125	...	120
542,270	,,	Aug. 8	10	7	Derby Con.	150—160[c]	...	...
55,000	,,	July 4	4	4	Do. 4 p.c. Deb.	75—85[c]	...	...
209,000	,,	Sept. 5	5	5	East Hull Ord. 5 p.c. ...	97—102	...	...
179,500	,,	Aug. 22	5⅔	6	East Surrey Ord. 5 p.c. ...	108—118	...	...
155,019	,,	June 20	5	5	Do. 5 p.c. Deb. ...	118—123	...	...
1,002,180	,,	Sept. 19	14½	15	European, Ltd.	122—127	...	121½—125½
19,405,992	,,	Aug. 8	5⅔	5⅔	Gas Light & Coke 4 p.c. Ord.	23/—25/-[f]	...	23/1½—23/10½
2,600,000	,,	,,	3⅜	3⅜	Do. 3⅜ p.c. max.	80—85	...	80—82
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	99—102	−1	99—101
6,102,497	,,	June 20	3	3	Do. 3 p.c. Con. Deb. ...	79—83	−1	79—81½
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	111—116	...	114—115
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	108—112	−2	109½—111½
264,011	,,	Aug. 22	—	6	Harrogate New Cons. ...	110—115	...	...
82,500	,,	Aug. 22	7	7	Hastings & St. L. 5 p.c. Conv.	130—140	...	...
258,740	,,	,,	5½	5½	Do. 5½ p.c. Conv.	102—107	...	105—106
70,000	10	Oct. 17	†10	†10	Hongkong & China, Ltd. ...	9½—10½	...	...
213,200	Stk.	Aug. 22	6	6	Hornsey Con. 3½ p.c. ...	117—122	...	...
5,600,000	,,	Nov. 21	14	10	Imperial Continental Cap.	195—205*	−5	196—200
228,180	,,	Aug. 8	3½	3½	Do. 3½ p.c. Red. Deb.	90—95	...	92½—93
235,242	,,	Aug. 8	8½	8½	Lea Bridge 5 p.c. Ord. ...	152—162	+2	...
2,145,907	,,	Aug. 22	6	6	Liverpool 5 p.c. Ord. ...	118—119[b]	...	...
245,500	,,	June 20	5	5	Do. 5 p.c. Red. Pref. ...	100—110[b]	...	...
306,083	,,	July 15	4	4	Do. 4 p.c. Deb.	100—102	...	...
165,786	,,	Sept. 5	10	8	Maidstone 5 p.c. Cap. ...	160—170	+5	160
56,176	,,	June 20	3	3	Do. 3 p.c. Deb. ...	69—74	...	...
75,000	5	June 20	†10	†10	Malta & Mediterranean ...	7½—8½	...	...
893,000	—	Oct. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	97—102	...	...
171,978	Stk.	Sept. 5	5	5	M. S. Utility "C." Cons. ...	100—110	...	...
718,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	90—95	...	90½—92
112,126	,,	July 4	4	4	Do. 4 p.c. Deb. ...	95—100	...	99¾
148,955	,,	,,	5	5	Do. 5 p.c. Deb.	115—120	...	...
675,000	,,	21 May '31	†6	†6	Montevideo, Ltd.	35—45	...	39—39½
2,061,315	,,	Aug. 8	5⅔	5	Newcastle & Gateshead Con.	22/3—23/3[d][f]	+/3	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	90½—91½[d]	...	...
691,705	,,	June 20	3½	3½	Do. 3½ p.c. Deb. ...	89—91[d]	...	...
277,285	,,	Nov. 7	5	5	Do. 5 p.c. Deb. '43...	103—107[d][e]	...	...
274,000	,,	Aug. 8	5	5	Newport (Mon.) 5 p.c. max.	93—95[a]	...	...
199,940	,,	Aug. 22	7½	7½	North Middlesex 6 p.c. Con.	135—145	...	...
396,160	,,	Aug. 8	5	5	Northampton 5 p.c. max. ...	96—101	...	...
300,000	,,	Apl. 18	9	7	Oriental, Ltd.	106—111	+1	...
205,162	,,	June 20	8	8	Plym'th & Stonehouse 5 p.c.	142—152	...	...
504,416	,,	Aug. 22	8	8	Portsm'th Con.Stk. 4 p.c.Std.	147—157	+5	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	97—102	...	...
114,000	,,	Aug. 8	5	5	Preston 5 p.c. Pref.	105—110	...	...
686,312	,,	July 18	4	4	Primitiva 4 p.c. Rd. Db. 1911	77—82	...	...
389,813	,,	June 20	4	4	Do. 4 p.c. Cons. Deb.	77—82	...	...
750,000	10	Sept. 19	6	6	San Paulo 6 p.c. Pref. ...	6⅞—7½	...	...
1,786,968	Stk.	Sept. 5	6	6	Sheffield Cons.	110—114[e]	...	...
95,000	,,	July 18	4	4	Do. 4 p.c. Deb.	92—96[e]	...	...
133,201	,,	Sept. 5	5	8½	Shrewsbury 5 p.c. Ord. ...	113—118	...	...
90,000	10	June 6	15	15	South African	4—6	...	...
6,709,895	Stk.	Aug. 8	7	5	South Met. Ord.	120—125	...	119½—122
1,186,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	140—145	...	140—141
1,895,445	,,	July 4	3	3	Do. 3 p.c. Deb. ...	80—83	...	82½—84
1,000,000	,,	July 18	4	5	Do. 5 p.c. Red. Deb.	109—114	...	113
91,500	,,	Aug. 8	8½	8½	South Shields Con.	140—145[d]	+7½	...
1,543,795	,,	Aug. 8	6	6	South Suburban Ord. 5 p.c.	117—122	...	119—121½
800,000	,,	,,	5	5	Do. 5 p.c. Pref.	113—118	...	114½—116½
668,887	,,	June 20	5	5	Do. 5 p.c. Deb.	120—125	...	121—122½
647,740	,,	Aug. 22	5	5	Southampt'n Ord. 5 p.c. max.	101—106	...	...
121,275	,,	June 20	4	4	Do. 4 p.c. Deb.	95—100	...	...
350,000	,,	Aug. 8	—	9/-	Swansea 5½ p.c. Red. Pref.	110—114	...	113½
200,000	,,	June 20	6½	6½	Do. 6½ p.c. Red. Deb.	105—110	...	...
1,076,490	,,	Aug. 8	6⅔	6⅔	Tottenham and District Ord.	131—136	...	133
300,000	,,	,,	5½	5½	Do. 5½ p.c. Pref. ...	120—125	...	...
199,005	,,	June 20	4	4	Do. 4 p.c. Deb. ...	95—100	...	...
85,701	,,	Sept. 19	6	6	Tuscan, Ltd., 6 p.c. Red. Db.	67—72	...	...
846,069	,,	Aug. 22	7	7	Uxbridge, &c., 5 p.c. ...	130—140	...	...
88,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	112—117	...	...
1,822,220	,,	July 4	7	7	Wandsworth Consolidated	135—140	...	136—137
1,096,373	,,	,,	5	5	Do. 5 p.c. Pref.	115—120	...	...
1,317,964	,,	June 20	5	5	Do. 5 p.c. Deb.	120—125	...	120—122½
158,400	,,	Aug. 22	6g	5	Winchester W.&G.5p.c.Con.	100—105	+2	...

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of stock. *g* Paid £3. including 10s. on account of back dividends. * Ex. div. † Paid free of income-tax. ‡ For year. § In last week's List the business done in Bournemouth 5 p.c. Deb. at 123¾—124 should have been 123½—124.

STOCKS AND SHARES FOR SALE.

GLOUCESTER GAS LIGHT COMPANY.

SALE OF

£30,000

OF FIVE PER CENT. CONSOLIDATED ORDINARY (NEW) STOCK.

MR. E. J. J. RANDALL, F.S.I., F.A.I., is instructed by the Gloucester Gas Light Company TO SELL BY AUCTION, at the Gas Offices, Eastgate Street, Gloucester, on Friday, Dec. 16, 1932, at Three o'clock in the afternoon punctually, in Lots of £100 each (any purchaser of one Lot to have the option of taking up to 20 Lots at the same price):

£30,000

OF CONSOLIDATED ORDINARY (NEW) STOCK

of the Gloucester Gas Light Company, bearing Interest at 5 per cent. per annum.

Further Particulars and Conditions of Sale may be had from Mr. T. B. JAMES, Secretary, GAS OFFICES; Messrs. TAYNTON & SON, Solicitors, CLARENCE CHAMBERS; or of the AUCTIONEER, ALBION CHAMBERS, GLOUCESTER.

By Order of the Directors.

NEWHAVEN GAS AND COKE COMPANY, LTD.

Messrs. A. & W. RICHARDS

are Instructed to OFFER FOR SALE BY TENDER

5000

£1 ADDITIONAL ORDINARY SHARES,

ranking for a Standard Dividend of 8 per cent. subject to the Sliding Scale equally with existing similar Shares now receiving 8½ per cent.

Minimum Price of Issue, £1 9s. per Share.

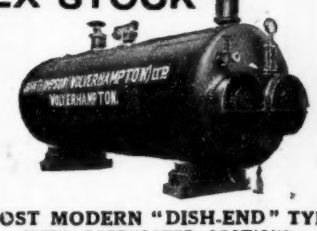
Yielding at that Price, £5 17s. 3d. per cent.

Prospectus and Form of Tender (which latter must be sent in by 11 o'clock on Wednesday, the 14th of December) may be obtained of A. & W. RICHARDS, 37, WALBROOK, E.C. 4.

NEW "THOMPSON"

BOILERS

EX STOCK



MOST MODERN "DISH-END" TYPE

WITH CORRUGATED SECTIONS.

	W.P. Shop No.
One 30 ft. × 9 ft. 3 ins. × 200 lbs.	7133
One 30 ft. × 9 ft. 3 ins. × 120 lbs.	7060
One 30 ft. × 8 ft. 6 ins. × 160 lbs.	6971
Two 30 ft. × 8 ft. 6 ins. × 160 lbs.	6983/4
One 30 ft. × 8 ft. 3 ins. × 210 lbs.	7175
One 30 ft. × 8 ft. 3 ins. × 160 lbs.	7054
One 30 ft. × 8 ft. 0 ins. × 180 lbs.	6574 (F.E.)
Two 20 ft. × 6 ft. 0 ins. × 150 lbs.	7110/1 (Cornish)
One 10 ft. × 4 ft. 0 ins. × 120 lbs.	6443 (Cornish)

All the above Boilers are built from "Siemens Martin" Acid Steel.

Also Water Tube, Economic, Cornish & Vertical Boilers.

SUPERHEATERS AND PIPEWORK INSTALLATIONS.

Repairs to all types of Boilers by first-class men.

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(WOLVERHAMPTON) LTD.,

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Alder & Mackay gas meters are The Acme of Accuracy. They are built essentially for a long life of hard work and enjoy a wide world reputation on account of their efficiency and reliability. You cannot buy better gas meters. Detailed particulars will be gladly sent on request.

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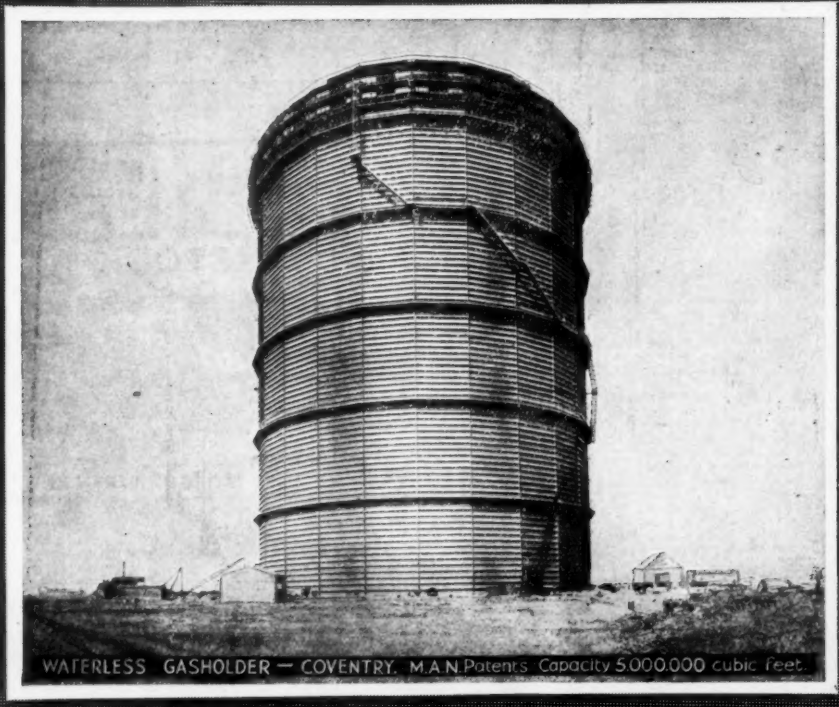

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WELDED AND RIVETTED STEEL PIPES, BOILERS

CLAYTON SON & Co LD., MOOR END, HUNSLET, LEEDS